
NATIONAL CENTER FOR EDUCATION STATISTICS

Statistical Analysis Report

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Disparities in Public School District Spending 1989–90

**A multivariate, student-weighted
analysis, adjusted for differences
in geographic cost of living and
student need**

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January 1995

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Foreword

This study represents the first that has combined an existing National Center for Education Statistics (NCES) database with the new 1990 Census demographic data mapped by NCES to school district boundaries. In this case, school district revenues and expenditures are compared by such school district characteristics as median income, median housing value, education attainment of householders, urbanicity, district size, and grade-level organization, and such student demographic variables as percentage in poverty, special education, limited English proficient, at-risk, and minority enrollment.

The study presents not only the actual revenues and expenditures, and those resources adjusted for geographic cost-of-living differences, but also resources adjusted for variations in school districts' student need. The rationale is that not only are geographic adjustments to expenditures and income necessary to achieve comparable purchasing power, but also that school districts with certain types of students, such as students with physical disabilities, students in poverty, or students who are limited English proficient, will encounter higher costs in educating those students. In part, this is because students with physical disabilities and students in poverty have federally sponsored supplemental instruction programs with additional teaching staff, and students who are limited English proficient require assistance in learning English and are instructed in their native language.

This research makes comparisons of the resources of school districts by their characteristics, measures the degree of variation in resources across districts, and makes comparisons of the spending on one characteristic, while holding all of the other characteristics constant. NCES believes that this is the first national study to carefully examine school district spending by community and student characteristics, adjusting for geographic cost differences,

and using multiple regression to control for the simultaneous influence of more than a single school district characteristic. The authors present the findings both with and without the adjustments and statistical techniques so the readers can choose to examine the results according to their analytical preferences.

The Research and Development (R & D) series of reports has been initiated:

- 1) To share studies and research that are developmental in nature. The results of such studies may be revised as the work continues and additional data become available.
- 2) To share the results of studies that are, to some extent, on the “cutting-edge” of methodological developments. Emerging analytical approaches and new computer software development often permit new, and sometimes controversial, analysis to be done. By participating in “frontier research,” we hope to contribute to the resolution of issues and improved analysis.
- 3) To participate in discussions of emerging issues of interest to education researchers, statisticians, and the federal statistical community in general. Such reports may document workshops and symposiums sponsored by NCES that address methodological and analytic issues or may share and discuss issues regarding NCES practice, procedures, and standards.

The common theme in all three goals is that these reports present results or discussions that do not reach definitive conclusions at this point in time, either because the data are tentative, the methodology is new and developing, or the topic is one on which there are

divergent views. Therefore, the techniques and inferences made from the data are tentative and are subject to revision. To facilitate the process of closure on the issues, we invite comment, criticism, and alternatives to what we have done. Such responses should be directed to:

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Executive Summary

The Purpose of This Report

Finance issues are among the most fundamental to public education. Questions relating to “who pays,” “how much,” and “for whom” are central to the concepts of equity and adequacy, which have long been at the heart of public education fiscal policy. Equity issues focus on the fairness of the overall public education allocation system. Given our decentralized system of public education, it is not surprising that more public dollars are spent on the education of some school children as opposed to others. These differences may not be undesirable or unwarranted. Given the variations in the cost of education resources and in the needs of students that are known to exist across districts, equal dollars per student may not result in equal education opportunities. Thus, a major fiscal policy question is: Where do expenditure differences occur and to what degree? If expenditure differences are simply related to the differing capacities of states and localities to purchase public education services, at what point do these differences result in inequities for different types of students? These expenditure differentials are especially of interest as they relate to children in particular categories of historical concern, such as minority status, poverty, and other at-risk factors.

To the extent that these types of questions pertain to unequal allocations of public education resources to students with comparable education needs, they are considered to be horizontal equity issues. Vertical equity relates to expenditure differences justified by the differing education needs of students. For example, all public education funding formulas allocate different amounts of revenue to districts to account for the differing education needs of some types of students (e.g., special education). Vertical equity questions relate to which kinds of students should be eligible for additional aid and the appropriate size for these supplements. Both of these sets of equity issues closely relate to the adequacy of education revenues. Are they sufficient for their intended purpose? As the exact purposes of education are not fully agreed upon and the technology of education is not well understood, objective determinations of whether given amounts of education resources are sufficient for their intended purpose generally cannot be made. For this reason, adequacy issues are most often expressed in terms

that are relative to some specific standard, and all of these traditional fiscal policy issues revert to basic questions about who is receiving how much and for what purpose.

This report begins to answer these and other important school finance questions in ways that have not been previously reported. Measures of how much districts receive in public funds from local, state, and federal governments and how these resources are used to provide public education services are available for all of the school districts in the country, and these measures are matched to such important district characteristics as the percentage of children living in poverty, the percentage of minority children, and average wealth. Through the use of resource cost factors, alternative measures of district spending are expressed in terms of relative “buying power,” and through the use of student-need adjustments, variations in the number of students with additional education requirements are also taken into account. Multivariate, as well as bivariate, analyses are used to isolate the impact of individual district and community factors on variations in expenditure. In addition to these adjusted forms, all of the resource measures included in this report are presented in their original (unadjusted) form for comparative purposes.

As an example, table A has been extracted from the main body of the report to illustrate the differing results that can be obtained through the use of bivariate and multivariate analyses. These data show that while the bivariate results indicate a positive relationship between student/teacher ratios and the percentage of minority enrollment, the multivariate data indicate the exact opposite relationship between these variables (columns 1 and 3). This difference results from the fact that while the bivariate results show the direct relationship between these two variables, the multivariate analyses also take simultaneously into account the effects of a number of variables believed to be relevant to variations in student/teacher ratios. Thus, while the bivariate analysis suggests a positive relationship between these two variables, the multivariate analysis indicates that this result is really an artifact of the relationship between the percentage of minority students and other related variables, such as the percentage of students in poverty and district urbanicity. Using the multivariate analysis, in which the relationship between all of these related variables and student/teacher ratios are considered simultaneously,

the relationship between percentage minority enrollments and student/teacher ratios becomes negative.

This example illustrates the importance of adding multivariate analyses to gain a fuller understanding of the relationships among the variables presented in this report. The general trends documented in this report primarily focus on the resource-cost and student-need-adjusted multivariate (fully adjusted) results. Although multivariate results are emphasized, the report notes when these general trends differ substantially from the actual bivariate results.

Table A.-- Student/teacher ratios by percentage of minority enrollment

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need-Adjusted (2)	Unadjusted Estimates (3)	Student-Need-Adjusted Estimates (4)
Minority Enrollment					
Less than 5%	21.9	17.0	19.1	18.7	21.5
5% - <20%	26.5	17.8	20.2	18.0	20.7
20% - <50%	25.7	18.2	21.0	17.7	20.4
50% or more	25.9	18.7	22.2	17.5	20.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Data Sources and Procedures

This report addresses school finance policy issues through the analysis of school district revenue and expenditure data from the 1990 Survey of Local Government Finances—School Systems (F-33) collected by the U.S. Bureau of the Census, as the collection request for the National Center for Education Statistics (NCES). To increase the policy relevance of these analyses, these fiscal data were matched to other NCES databases that provide more descriptive information about the districts and the communities in which they are located.

Three types of procedures were used to analyze these data:

- Comparisons of the actual and resource-cost and student-need-adjusted amounts of education resources received by different types of school districts and communities (bivariate analysis).
- Comparisons of the actual and resource-cost and student-need-adjusted amounts of education resources received by different types of school districts and communities, holding other factors constant (multivariate analysis).
- Measures of the degree of variation in resource quantities across districts (dispersion analysis).

Policy Questions

Four important policy questions that relate to the financing of public education are addressed in this report.

- How do education resource measures, such as total expenditures per student, vary in different types of school districts and communities across the nation?
- How do school districts serving different types of students and communities allocate resources across the categories of instruction, administration, and capital outlay?
- How do local, state, and federal revenues vary for school districts serving different types of students and communities?
- To what extent do education resource measures vary across the nation?

The first question is addressed by examining alternative measures of school district spending and the relationships of these measures to such district and community characteristics as the percentage of students in poverty, the percentage of minority students, and average

property wealth in the district. Addressing the second question involves breaking out aggregate expenditure measures into the more detailed categories of instruction, administration, and capital outlay. To address the third question, revenues are examined to assess varying reliance on local, state, and federal sources to support education services in different types of districts. The final question represents a departure from the basic approach used for questions one through three. The section of this report that addresses this question considers all of the school districts across the nation to assess total disparity in resource measures such as total expenditures.

Summary of Findings

How do education resource measures, such as total expenditures per student, vary in different types of school districts and communities across the nation?

- Of all the variables included in this report, the largest variations in average public education expenditures occur between regions. Fully adjusted expenditures per student are substantially higher in the northeastern region of the country and are lowest in the West (\$5,293 versus \$3,632).
- Public education expenditures per student are higher in the nation's smallest districts whereas students receive an average fully adjusted expenditure of \$4,862 versus \$4,216 in the largest districts (10,000 students and above).
- Greater education expenditures per student are associated with higher community socioeconomic status as measured by the value of owner-occupied housing (\$4,401 versus \$3,992, fully adjusted), or by education attainment (\$4,515 versus \$3,953, fully adjusted). However, this relationship is less pronounced when socioeconomic status is defined in terms of median household income. When the relationship between this variable and education expenditures is considered in isolation, only the wealthiest group is considerably different from the other groups.

- More money is spent in districts with the highest percentages of minority students compared to districts with the lowest percentages of minority students (\$4,514 versus \$3,920). Although minority students in poverty are often viewed as those least served by current systems of public education funding, these findings suggest that while inequalities may remain for students in poverty, they do not appear to be driven by minority status.
- Public education expenditures per student are highest in low poverty districts. The fully adjusted differential between the highest and lowest poverty districts is \$309 per student (\$4,219 versus \$4,528). However, this relationship is not linear and affects only the 11 percent of students in the wealthiest districts. Among the other 89 percent of students, the variation is only \$8 per student.¹
- Districts with the highest percentages of students in special education show higher overall actual expenditures than do districts with the lowest percentages of special education students (\$5,447 versus \$5,061). However, when differences in the cost of living and the added cost of serving students with supplemental needs are included, an opposite expenditure pattern is observed (\$4,219 versus \$4,510).

How do school districts serving different types of students and communities allocate resources across the categories of instruction, administration, and capital outlay?

- Student/teacher ratios vary substantially by district size and region of the country. In both actual and adjusted terms, the average ratio is over 20 percent

¹ *These findings differ from earlier analyses of the relationship between education expenditures and poverty conducted by Schwartz and Moskowitz (1988). Their state-by-state analyses reported three states with negative correlations, 14 states near zero, and 33 states with a positive relationship between these two variables. To further test our findings, which are based on more current data and evaluate this relationship on a national basis, we ran analyses dividing the districts into exact poverty quartiles. We also ran a straight correlation between the various measures of education spending used in this report and the percentage of school-age children in poverty. In each case we found a negative relationship between spending and poverty. Further analyses would be required to determine whether these contradictory findings represent a change over time (the Schwartz and Moskowitz poverty data are from 1979, while the data used in this report are from the 1990 census) or represent differences in the unit of analysis or in the methodological approach.*

larger in the nation's largest districts (10,000 students or more) as opposed to the smallest (less than 1,000 students).² In actual terms, the average student/teacher ratio in the smallest districts is 15.1 as compared to 18.8 in the largest districts. These differences are even more pronounced by geographic region of the country, with the Northeast showing an average student/teacher ratio of 15.6 as compared to 21.9 for the West. The Midwest and South show average student/teacher ratios falling between these two values, at 17.3 and 17.1, respectively.

[Note: The following expenditure results were obtained only through bivariate analysis and do not control for other district characteristics. As such, they should be interpreted with greater caution than the results obtained through multivariate analysis.]

- Districts serving relatively high percentages of students in poverty, minority students, or limited English proficient (LEP) students allocate greater percentages of their funds to core instructional purposes than do districts serving lower percentages of students in these same groups.
- Capital outlay is the area of expenditure found to be the most sensitive to variations in total district spending compared to the categories of instruction and administration.³ Districts with less to spend tend to focus on direct instruction and administration at the expense of capital expenditures.
- By region, districts in the northeastern section of the country spend more in the area of administration and support than the other regions (the Midwest, the

² Student/teacher ratios are only adjusted for student-need variations. Because this resource is expressed in actual rather than dollar terms, resource-cost adjustments are inappropriate for this measure.

³ *For the purposes of this study, capital outlay includes land purchases, building repair and construction, and expenditures on equipment. In subsequent analyses these categories of capital expenditure might be analyzed in more detail. It should also be noted that these analyses report actual expenditures. While annualized costs are generally considered more appropriate in analyses of capital items, these cost data were not available.*

South, and the West), and districts in the West spend appreciably less (\$1,371 versus \$831 per student).

How do local, state, and federal revenues vary for school districts serving different types of students and communities?

- The amount of local support for public education rises with the wealth and socioeconomic condition of the community.
- State funds are the primary equalizing force in public education resource allocations.
- Although state and federal allocations are larger in districts with large numbers of special, compensatory, and LEP students, based on the student-need adjustments used in this study, these additional funds appear to be insufficient to offset the supplemental cost of these programs.

To what extent do education resource measures vary across the nation?

- The distribution of public education resources is substantially more nearly equal than wealth measured by housing values, and somewhat less varied than wealth measured by household income.
- State public education allocation systems are the primary equalizing factors of education resources, with some additional equalization resulting from the various federal funding programs.

Implications for Further Research

The results obtained through multiple regression demonstrate that school district spending substantially varies by geographic region, as does student/teacher ratio. This substantial difference in education funding by region may be a matter of concern—the implications of which need to be thoroughly explored by the school finance research community.

Two findings of this study run somewhat counter to initial expectations. First, spending by school district size is higher only for those school districts with under 1,000 enrollment, other factors being equal. This seems to suggest that the expected diseconomies of small scale only hold for the nation's smallest school districts, a finding that may elicit further study.

A second, somewhat surprising, finding is that more money is spent in districts with the highest percentages of minority students (\$4,514 versus \$3,920), holding other school district and community characteristics constant. This finding should be further explored by school finance researchers.

A less surprising finding is that greater total expenditures per student are associated with higher community socioeconomic status, measured by the value of owner-occupied housing (per student expenditures of \$4,401 versus \$3,992, other factors held constant), or by education attainment (\$4,515 versus \$3,953). Differences in student/teacher ratios also appear but are less than 1.5 students per teacher.

When socioeconomic status is measured by cost-adjusted median household income, however, and all other factors are held constant, the expenditures per student between the highest and lowest income groups differ by only \$186 (\$4,382 versus \$4,196). These findings relating alternative measures of socioeconomic status to education spending provide a fertile field for further research.

Public education total expenditures per student are highest in low poverty districts, but unlike socioeconomic status, the relationship is not linear. Controlling for other factors, the differential between the highest and lowest poverty districts is \$309 per student (\$4,219 versus

\$4,528). Controlling for other school district characteristics, only school districts in the category with the fewest children in poverty spend substantially more per student.

It is also worthy of note that smaller dollar differences in per student expenditures are observed when core instructional, as opposed to total, expenditures are examined by socioeconomic status. Core instructional expenditures reflect the central purpose of the local education agency, which is to educate children. These findings suggest that lower wealth districts appear to be investing a larger percentage of their spending on core instruction, rather than on other areas. Although such findings mitigate total expenditure differences by socioeconomic status, they may also indicate that poor school districts are deferring needed school construction, renovation, and the purchase of instructional equipment. The current study is unable to completely explore the differences in spending for capital outlay, which includes both school construction and purchases of equipment. This also provides yet another opportunity for further research.

Introduction

The Purpose of This Report

Finance issues are among the most fundamental to public education. Questions relating to “who pays,” “how much,” and “for whom” are central to the concepts of equity and adequacy, which have long been at the heart of public education fiscal policy. Equity issues focus on the fairness of the overall public education allocation system. Given our decentralized system of public education, it is not surprising that more public dollars are spent on the education of some school children as opposed to others. These differences may not be undesirable or unwarranted. Given the variations in the cost of education resources and in the needs of students that are known to exist across districts, equal dollars per student may not result in equal education opportunities. Thus, a major fiscal policy question is: Where do expenditure differences occur and to what degree? If expenditure differences are simply related to the differing capacities of states and localities to purchase public education services, at what point do these differences result in inequities for different types of students? These expenditure differentials are especially of interest as they relate to children in particular categories of historical concern, such as minority status, poverty, and other at-risk factors.

To the extent that these types of questions pertain to unequal allocations of public education resources to students with comparable education needs, they are considered to be horizontal equity issues. Vertical equity relates to expenditure differences justified by the differing education needs of students. For example, all public education funding formulas allocate different amounts of revenue to districts to account for the differing education needs of some types of students (e.g., special education). Vertical equity questions relate to which kinds of students should be eligible for additional aid and the appropriate size for these supplements. Both of these sets of equity issues closely relate to the adequacy of education revenues. Are they sufficient for their intended purpose? As the exact purposes of education are not fully agreed upon and the technology of education is not well understood, objective determinations of whether given amounts of education resources are sufficient for their intended purpose generally cannot be made. For this reason, adequacy issues are most often expressed in terms

that are relative to some specific standard, and all of these traditional fiscal policy issues revert to basic questions about who is receiving how much and for what purpose.

This report begins to answer these and other important school finance questions in ways that have not been previously reported. Measures of how much districts receive in public funds and how these resources are used to provide public education services are available for all of the school districts in the country, and these measures are matched to such important district characteristics as the percentage of children in poverty, the percentage of minority children, and average wealth. Through the use of cost adjustments, alternative measures of district spending are expressed in terms of relative “buying power,” and through the use of student weights, variations in student need are also taken into account. Multivariate, as well as bivariate, analyses are used to isolate the impact of individual district and community factors on variation in expenditure. In addition to these adjusted forms, all of the resource measures included in this report are presented in their original (unadjusted) form for comparative purposes.

This report addresses four questions that are fundamental to public education fiscal policy:

- How do education resource measures, such as total expenditures per student, vary in different types of school districts and communities across the nation?
- How do school districts serving different types of students and communities allocate resources across the categories of instruction, administration, and capital outlay?
- How do local, state, and federal revenues vary for school districts serving different types of students and communities?
- To what extent do education resource measures vary across the nation?

The first question examines alternative measures of school district spending and the relationships of these measures to such district and community characteristics as the percentage of students in poverty, the percentage of minority students, and average property wealth in the district. The second question examines the breakout of aggregate expenditure measures into the more detailed categories of instruction, administration, and capital outlay. To address the third question, revenues are examined to assess varying reliance on local, state, and federal sources to support education services in different types of districts. The final question assesses total disparity in resource measures such as total expenditures across the nation.

Interest in these fundamental questions about the financing of public education is as old as public education itself. Over time, and for a number of reasons, questions related to support for public education have become among the most important we face as a nation. The growing competitiveness associated with global markets has made it increasingly clear that an educated and skilled populace is perhaps our most valuable national resource. Increasingly, education attainment is being seen as synonymous with national well-being. This renewed sense of urgency regarding the importance of the public education investment is sounded in the landmark reform document, *A Nation At Risk, the Imperative for Educational Reform* (National Commission on Excellence in Education 1983). Referring to the importance of public education, it begins:

Our nation is at risk. Our once unchallenged preeminence in commerce, industry, science, and technological innovation is being overtaken by competitors throughout the world. This report is concerned with only one of the many causes and dimensions of the problem, but it is the one that undergirds American prosperity, security, and civility.

This concern with public education is carried to the present through the formation of such national education policy as *Goals 2000: Educate America*. Described by the U.S. Secretary of Education Riley as “the most comprehensive and important new federal legislation affecting K-12 education in years,” this law specifies a set of goals and procedures for “reinventing American education” by the year 2000 (U.S. Department of Education 1994).

Concepts related to public education are also viewed as fundamental to our national identity. Access to public education has long been considered central to equality of opportunity. Public education is generally considered to be the primary vehicle for providing equality of access to the opportunities in life.

The high level of interest in the financing and provision of public education services has generated substantial research and policy activity. For example, a number of efforts have been made to assess the degree of equity in school finance (Berne and Stiefel 1984; Schwartz, Myron, and Moskowitz 1988; Carroll 1983). The courts have also played a major role relative to school finance equalization (Clune 1992) with legal challenges to the equity of school financing in half of the states in the nation (Hickrod 1994). Qualitative analyses, such as Jonathan Kozol's *Savage Inequalities* (1991), sometimes portray a stark picture of what inadequate levels of education resources can mean on an individual basis, especially for minority students living in extreme poverty.

Data Sources and Procedures

This report addresses school finance policy issues through the analysis of school district revenue and expenditure data from the 1990 Survey of Local Government Finances—School Systems (F-33) collected by the U.S. Bureau of Census, as the collection request for the National Center for Education Statistics (NCES). All of the public school districts in the nation are represented in this data collection, although only “regular” school districts were included in the analysis (excluding special education districts, for example). To increase the policy relevance of these analyses, these fiscal data were matched to other databases that provide more descriptive information about districts and the communities in which they are located. These other data sources are the nonfiscal data from the Common Core of Data (CCD) from the 1989-1990 school year and the 1990 data collected by the U.S. Bureau of the Census mapped by school district. The resulting dataset enables the examination of public education expenditure patterns in public school districts across the nation, as well as the comparison of these allocations across a full set of district and community characteristics. Data sources, procedures, and limitations are described in more detail in Appendix D.

Resource measures. Fiscal and actual resource measures are presented in this report. The fiscal resource measures include total revenues, total expenditures, current operating expenditures, and core instructional expenditures. The first measure includes the total amount of district revenues from local, state, and federal sources. The first two expenditure measures, total and current operating expenditures, differ by the inclusion of capital outlay (school construction and renovation and the purchase of equipment) and debt service. Core instructional expenditures are limited to all district expenditures associated with actual instructional services. For example, school and general administrative expenditures are excluded from this last expenditure measure.

The last resource measure used in this report is the average number of students per teacher. This measure of actual education resources is derived by dividing the total number of students in the district by the total number of teachers, and includes individuals who teach in an environment other than a regular classroom setting (e.g., a special education teacher in a resource room).

District and community variables. The district variables included in this report are the enrollment of the districts and the district's level of instruction (elementary, secondary, or unified). Districts are also described by the types of students they enroll; these student characteristics include the percentages of children who live in poverty, who are special education, who have limited proficiency in English, who are minority, and who are at-risk.¹

Community measures include type of location (i.e., urban, suburban, or rural) and region of the country. Community wealth is measured by household income and the value of owner-occupied housing within the district's boundaries.² Characteristics of community residents

¹ "At-risk children" is a variable created by the U.S. Bureau of Census. The Census definition is "living with a single mother who is not a high school graduate and is below the poverty line."

² In the full set of analyses, as presented in Appendix A, median household income was included in nominal and cost-adjusted forms to reflect the differing purchasing power of a given level of family income in different locations. Only the cost-adjusted results are shown in the main body of the report because of the minimal difference between these two sets of results. The variable median value of owner-occupied housing was only presented in its nominal form because these values already reflect the types of regional market conditions the resource costs are designed to represent.

include the percentage of householders with high school diplomas and the percentage of persons living in poverty. More detailed descriptions of the variables, and other terms used in this report, are included in Appendix E. The procedures used in deriving the breakpoints for these variables are described in Appendix D.

Resource adjustments. The resource measures listed above are presented in several alternative forms:

Actual quantities reflect the resource amounts actually reported for individual districts by the state education agency.

Resource-cost-adjusted amounts reflect dollar amounts adjusted for cost variations in different localities. Along with most other commodities, dollars spent for education services have varying levels of buying power in different areas of states and across the nation. Education resources are expressed in resource-cost-adjusted terms to reflect variations in real education resources, as opposed to nominal dollars. The resource-cost adjustments used in this report are based on cost-of-living adjustments designed to distinguish between metropolitan and rural areas within each state (McMahon and Chang 1991). The strengths and limitations of these indices, as well as alternative measures that might be used for these purposes, are described in Appendix D.

Student-need-adjusted quantities are derived from a set of adjustments that account for differing compositions of student need within school districts. For example, equal education resources for a class of 25 special education and a class of 25 regular education students may produce very unequal levels of service in relation to the needs of the students enrolled. The student-need adjustments used for this study reflect the varying resource needs of three commonly recognized categories of special needs students. The following types of students were counted, or weighted, to equal more than one student:

- Special education students were given a weight of 2.3.

- Compensatory education students were given a weight of 1.2.
- Limited English proficient (LEP) students were given a weight of 1.2.

To apply this type of adjustment, the counts of special needs students in each district are multiplied by their weights to derive a total weighted count of students. For example, 100 special education students are counted as 230 regular education students. The weight of 2.3 reflects findings from several national studies of special education costs that show services for special education students to be 2.3 times as costly as for their regular education counterparts (Moore, Strang, Schwartz, and Braddock 1988; Chaikind, Danielson, and Brauen 1993). Unfortunately, there are no nationally representative cost data for compensatory education (Chapter 1) students or for LEP students. As stated by Levin (1989), “there is no single cost estimate that can be used as a basis for funding a major education program for at-risk students.” He goes on to suggest an estimated weight of 1.5, with an alternative possible weight of 1.2. This latter weight is based on the average Chapter 1 allocation per student in relation to the average total expenditure per student in 1987. For the purposes of this study, the more conservative estimate of 1.2 is used for both compensatory education and LEP students.³

Because the application of these student weights will always have the effect of increasing the student count in districts with special needs students, student-need-adjusted enrollment will always be as large as, or larger than, the actual count of students. Conversely, resource quantities per student will be less when expressed in student-need-adjusted terms. The full derivation and use of these student weights, and their limitations, are described in Appendix D.

³ The counts of compensatory education and limited English proficient (LEP) students by district used in this study were also based on estimates. The count of compensatory students was based on the percentage of school-age children in the district living in poverty. The LEP count was based on the percentage of school-age children residing in the district who live in homes in which the language spoken is not English, and who speak English “not well” or “not at all.” Both of these data items were derived from the 1990 Census Mapping data.

Resource-cost and student-need-adjusted quantities combine both of these types of adjustments. They reflect the relative purchasing power of education dollars when both resource-cost and student-need differentials are taken into account. This weighting has the effect of producing analytic results that apply to the typical student in a typical district of a certain type. For example, average expenditures per student can be compared across districts in different size categories, holding constant the varying needs of students in those districts or differences in resource costs. This allows the impact of district size to be separated from those other factors.

Three types of procedures were used to analyze these data:

- Comparisons of the actual and resource-cost and student-need-adjusted amounts of education resources received by different types of school districts and communities (bivariate analysis).
- Comparisons of the actual and resource-cost and student-need-adjusted amounts of education resources received by different types of school districts and communities, holding other factors constant (multivariate analysis). The 12 factors are district enrollment, district type, percentage of children in poverty, percentage of special education students, percentage of LEP children, percentage of minority enrollment, percentage of at-risk children, metropolitan status, geographic region, median household income (cost-adjusted), median value owner-occupied housing, and education attainment of householders. In comparing districts on any one factor, the values represent districts with average values on all of the other factors. (See Appendix D for full description of regression model.)
- Measures of the degree of variation in resource quantities across districts (dispersion analysis).

The first approach is presented in the form of cross-tabulations of average values. For example, it is used to show simple relationships between actual and fully adjusted expenditures per student and the percentage of minority students. The second analytical approach reveals the impact of each individual district and community factor on alternative resource allocation measures in districts that are similar on other factors. This type of multivariate analysis sheds light on how simple two-way relationships between variables (e.g., the percentage of minority students and expenditures per student) can be better explained by taking other factors into account (e.g., the percentage of students in poverty). The final set of procedures measures the degree of variation in quantities of education resources per student. For example, this approach provides alternative measures of the difference between high and low spending districts.

The importance of the multivariate analyses to a more complete understanding of the true relationships among the variables presented in this report is illustrated in table 14 on page 38. This shows the differing results that can be obtained through the use of bivariate and multivariate analyses. These data show that although the bivariate results indicate a positive relationship between student/teacher ratios and the percentage of minority enrollment, the multivariate data indicate the exact opposite relationship between these variables. This difference results from the fact that although the bivariate results show the direct relationship between these two variables, the multivariate analyses also take simultaneously into account the effects of a number of variables believed to be relevant to variations in student/teacher ratios. Thus, while the bivariate analysis suggests a positive relationship between these two variables, the multivariate analysis indicates that this result is really an artifact of the relationship between the percentage of minority students and other related variables, such as the percentage of students in poverty and district urbanicity. The multivariate analysis shows that when the relationship between all of these related variables and student/teacher ratios are considered simultaneously, the relationship between percentage minority enrollments and student/teacher ratios becomes negative.

The full set of tables showing results from all three of these analytical approaches is found in Appendix A. All of the detailed results presented throughout the body of this report are drawn from Appendix A. All results are weighted by student enrollment, which causes a

district of 2,000 students to make twice the contribution to a national average than a district of 1,000 students (i.e., each *student* is weighted equally). Standard deviations for tables A1.1 - A7.2 of Appendix A are shown in Appendix B. These tables are included to provide a standard measure of variation for the alternative expenditure results. Appendix C contains the number of districts in each of the district and community characteristic categories.

Findings

Findings are presented in four sections, based on the major policy questions listed in the introduction. Tables containing the full set of results from the analyses underlying this report are presented in Appendix A. The discussion that follows draws on excerpts from these full tables, presented in tabular and graphic form.

How Do Education Resource Measures, Such as Total Expenditures Per Student, Vary in Different Types of School Districts and Communities Across the Nation?

Summary of findings. How do education expenditures vary with alternative district and community measures? Students in districts enrolling the *lowest* percentages of students in poverty and the *lowest* percentages of students in need of special education services received the *highest* expenditures. While these trends are matters of concern from a student equity perspective, they should be considered in the context of no clear patterns of expenditure differentials for limited English proficient and at-risk students, and a positive relationship between percentage of minority students and expenditures. A summary of the most important individual findings from this section is provided below.

- *Of all the variables included in this report, the largest variations in average public education expenditures occur between regions. Fully adjusted expenditures per student are substantially higher in the northeastern region of the country and are lowest in the West (\$5,293 versus \$3,632).*
- *Public education expenditures per student are highest in the nation's smallest districts whereas students receive an average fully adjusted expenditure of \$4,862 versus \$4,216 in the largest districts (10,000 students and above).*
- *Greater education expenditures per student are associated with higher community socioeconomic status as measured by the value of owner-occupied housing (\$4,401 versus \$3,992, fully adjusted) or by education attainment (\$4,515 versus*

\$3,953, *fully adjusted*). However, this relationship is less pronounced when socioeconomic status is defined in terms of median household income. When the relationship between this variable and education expenditures is considered in isolation, only the wealthiest group is considerably different from the other groups.

- *More money is spent in districts with the highest percentages of minority students compared to districts with the lowest percentages of minority students (\$4,514 versus \$3,920).* Although minority students in poverty are often viewed as those least served by current systems of public education funding, these findings suggest that while inequalities may remain for students in poverty, they do not appear to be driven by minority status.
- *Public education expenditures per student are highest in low poverty districts.* The fully adjusted differential between the highest and lowest poverty districts is \$309 per student (\$4,219 versus \$4,528). However, this relationship is not linear and affects only the 11 percent of students in the wealthiest districts. Among the other 89 percent of students, the variation is only \$8 per student.
- *Districts with the highest percentages of students in special education show higher overall actual expenditures than do districts with the lowest percentages of special education students (\$5,447 versus \$5,061).* However, when differences in the cost of living and the added cost of serving students with supplemental needs are included, an opposite expenditure pattern is observed (\$4,219 versus \$4,510).

Detailed findings by district characteristics.

Minority enrollment. The average expenditure data presented in this section of the report will be presented in four columns, as shown in table 1. The first two expenditure columns show the bivariate results, and the last two columns present the expenditure estimates

from the multivariate analysis. In both of these two pairs of columns, actual (unadjusted) expenditures are compared to the fully adjusted results. While the bivariate analysis is only based on the two variables listed in the table (e.g., total expenditures and percentage of minority enrollment), the multivariate analysis shows average expenditures by percentage minority with the effects of all the other variables included in this analysis also taken into account. The other variables included in the multivariate analysis are presented in the individual tables 1 through 12, and are summarized in table A9 in Appendix A.

In assessing the relationship between two listed variables (e.g., percentage of minority enrollment and expenditures), it is important to examine all four of the alternative sets of results shown in each table. Any single set of numbers presented in isolation from the others may present a very different set of interpretations than viewing the full set of adjusted and unadjusted findings. The first district variable, percentage of minority students, will be used as the basis for describing and presenting a rationale for using these four columns of expenditure results. This variable is especially appropriate for this purpose because shifting expenditure patterns are observed across the four columns.

Column 1, the actual bivariate results, shows the average actual expenditure per student for each of the four percentage of minority student groupings. Considerably larger average actual expenditures per student are shown in districts with the highest percentages of minority students (50 percent or more). In column 2, these actual expenditures are adjusted to reflect variations in resource costs and student needs using the cost adjustment factors described above. The potential impact of these types of adjustments is well illustrated in the case of this variable, because the expenditure trend observed in column 1 is reversed in column 2. That is, when expenditures are converted to “buying power” through the application of resource-cost and student-need adjustments, the districts enrolling the highest percentages of minority students are shown to have the *least*, rather than the *most*, purchasing power. This reversal is due to the fact that districts with high percentages of minority students tend to be in urban, higher cost areas that tend to have greater percentages of students with greater needs (i.e., in poverty or with limited English proficiency).

In columns 3 and 4, unadjusted versus cost- and need-adjusted expenditures are again presented as in columns 1 and 2. The difference is that in these latter two cases, the relationship between percentage minority enrollment and average expenditures is estimated within the context of a number of other variables that have been shown to also relate to variations in district expenditures. The expenditure data in columns 3 and 4 show the estimated impact of the percentage of minority students in the district on actual and cost- and need-adjusted expenditure estimates when the impact of a number of other variables that might influence these are also taken into account. When we remove, or “hold constant,” the impact of variables such as percentage of students in poverty, a positive relationship between expenditures and percentage minority is shown in both the unadjusted (column 3) and the adjusted (column 4) estimates.

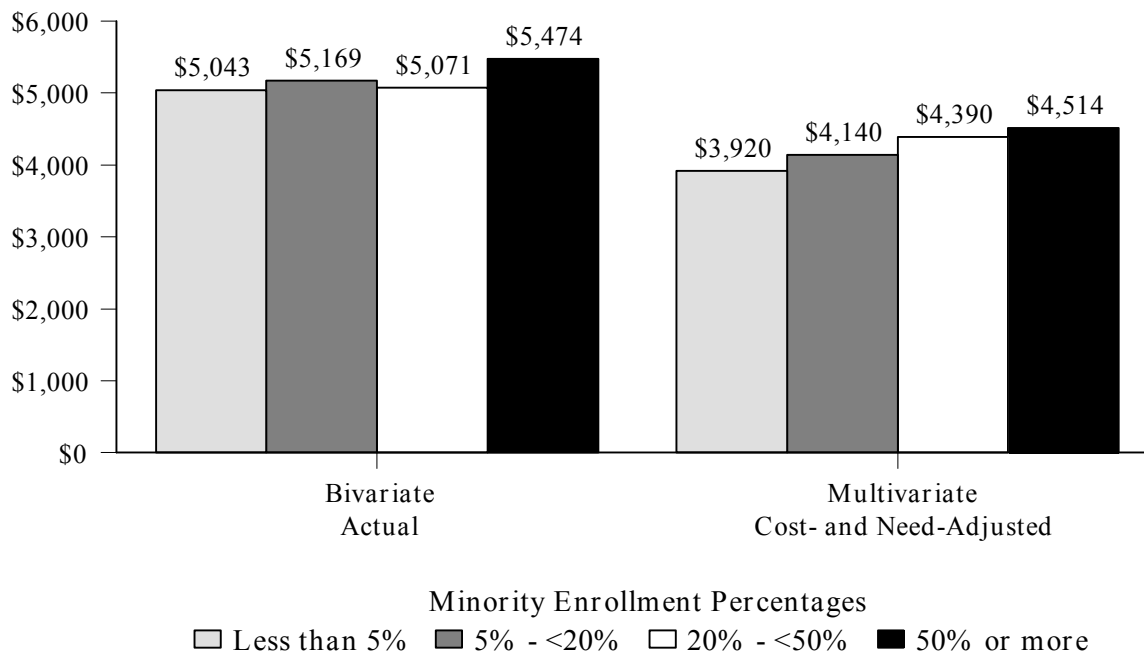
These findings illustrate the importance of presenting all four sets of results in conjunction with each of the variables to be presented in this section of the report. However, because the fully adjusted estimates presented in column 4 are considered to have the most utility for comparative purposes, these findings will be given the most emphasis in the narrative. Accordingly, references to “fully adjusted” as opposed to “actual” expenditures compare the estimates from column 4 to the actual expenditure data presented in column 1. This comparison is also shown in graphic form (figure 1).

Table 1.-- Total expenditures per student by percentage of minority enrollment

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Minority Enrollment					
Less than 5%	21.9	\$5,043	\$4,389	\$4,581	\$3,920
5% - <20%	26.4	5,169	4,350	4,954	4,140
20% - <50%	25.6	5,071	4,190	5,418	4,390
50% or more	26.1	5,474	4,103	5,740	4,514

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 1.-- Actual and adjusted total expenditures per student by percentage of minor enrollment

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data.

NOTE: All results are weighted by district enrollment.

The multivariate analysis (columns 3 and 4) shows a clear, positive relationship between the percentage of minority students and expenditures in a district, when factors are equal. This indicates that among districts that are similar among such factors as percentage poverty and urbanicity, more is spent per student in high minority districts than in low minority districts (\$4,514 versus \$3,920).

Minority children in poverty are often viewed as those least served through current public education allocation systems. These findings suggest that although general inequalities may remain for students in poverty, they do not seem to be driven by minority status.

School-age children in poverty. As shown in table 2 and figure 2, actual public education expenditures are higher for children in low poverty districts (less than 5 percent poverty) than in other districts. However, among districts with more than 5 percent poverty, average expenditures per student are similar whether the poverty percentage is less than 15 percent or more than 25 percent. The expenditure disparity between districts enrolling the lowest percentages of students in poverty and the other districts depends on the resource measure used. The degree of variation is the greatest in terms of unadjusted, actual dollars. However, when actual dollars (table 2, column 1) are adjusted to reflect resource-cost and student-need variations, this differential is reduced somewhat (table 2, column 2). When other factors that might affect the relationship between expenditures and poverty are taken into account through the multivariate analysis (e.g., income and property wealth), the unadjusted dollar variation associated with poverty is seen to be smaller (column 3). This suggests that of the actual expenditure difference of \$1,392 between the highest and lowest poverty districts (\$6,565 - \$5,173), all but \$574 (\$5,689 - \$5,115) can be better explained in terms of other types of differences between these same districts.

Table 2.-- Total expenditures per student by percentage of school-age children in poverty

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
School-Age Children in Poverty					
Less than 5%	11.3	\$6,565	\$5,209	\$5,689	\$4,528
5% - <15%	36.0	5,120	4,289	5,176	4,227
15% - <25%	26.3	4,736	4,003	5,091	4,205
25% or more	26.4	5,173	4,044	5,115	4,219

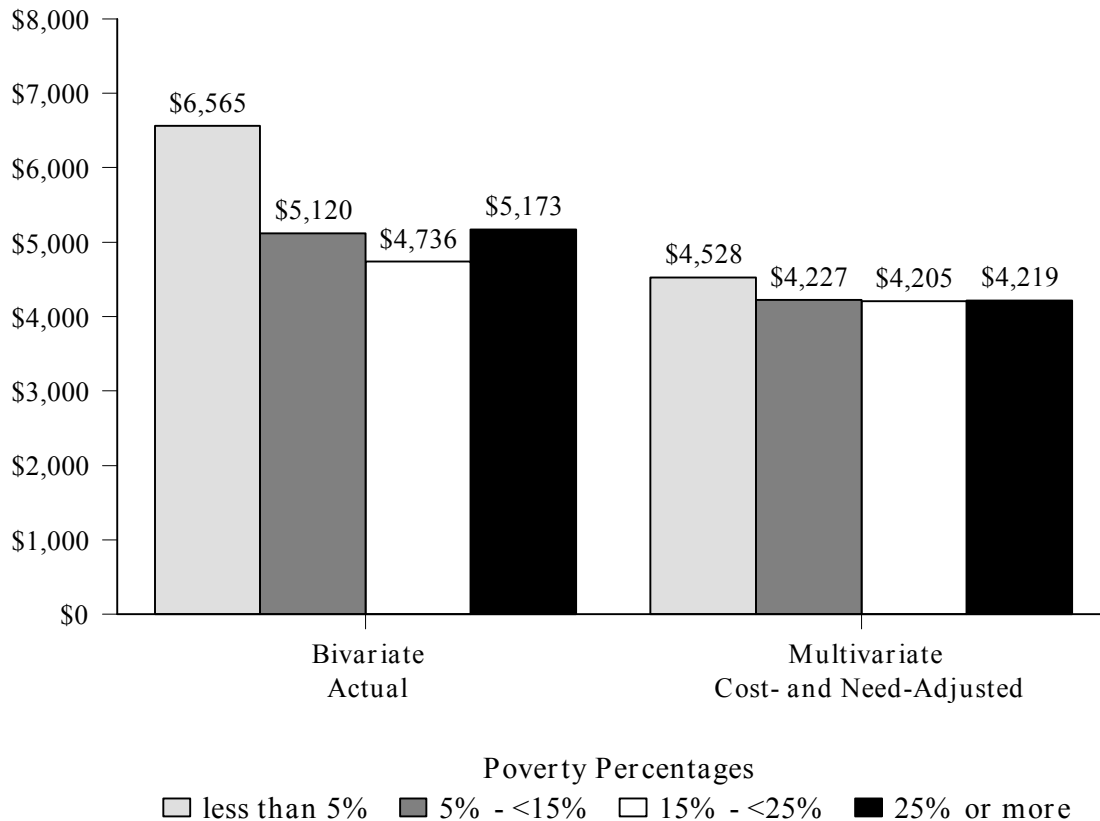
SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

The fully adjusted differential in expenditures between students in the districts enrolling the lowest and the highest percentages of students in poverty is shown to be \$309 (\$4,528 - \$4,219). It is also important to note that very little relationship between expenditures and poverty is shown for three of the four district poverty groupings. This overall pattern between expenditures and the percentage of students in poverty holds across all four columns of analyses. Only in the lowest poverty districts (less than 5 percent) are expenditures consistently higher, and in fully adjusted terms this differential is reduced to about 7 percent (\$4,219 versus \$4,528).⁴

⁴ These findings differ from earlier analyses of the relationship between education expenditures and poverty conducted by Schwartz and Moskowitz (1988). Their state-by-state analyses reported 3 states with negative correlations, 14 states near zero, and 33 states with a positive relationship between the two variables. To further test our findings, which are based on more current data and evaluate this relationship on a national basis, we ran analyses dividing the districts into exact poverty quartiles. We also ran a straight correlation between the various measures of education spending used in this report and the percentage of school-age children in poverty. In each case we found a negative relationship between spending and poverty. Further analyses would be required to determine whether these contradictory findings represent a change over time (the Schwartz and Moskowitz poverty data are from 1979, while the data used in this report are from the 1990 census) or represent differences in the unit of analysis and in the methodological approach.

Figure 2.-- Actual and adjusted total expenditures per student by percentage of school-age children in poverty



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Special education students. Students in districts with the highest percentages of students in special education show higher overall actual expenditures (table 3 and figure 3). However, when these expenditures are expressed in fully adjusted terms, the opposite is true. That is, although districts with higher percentages of special education students receive supplemental resources to serve those students, these additional funds appear to be insufficient to offset the supplemental cost of these programs.

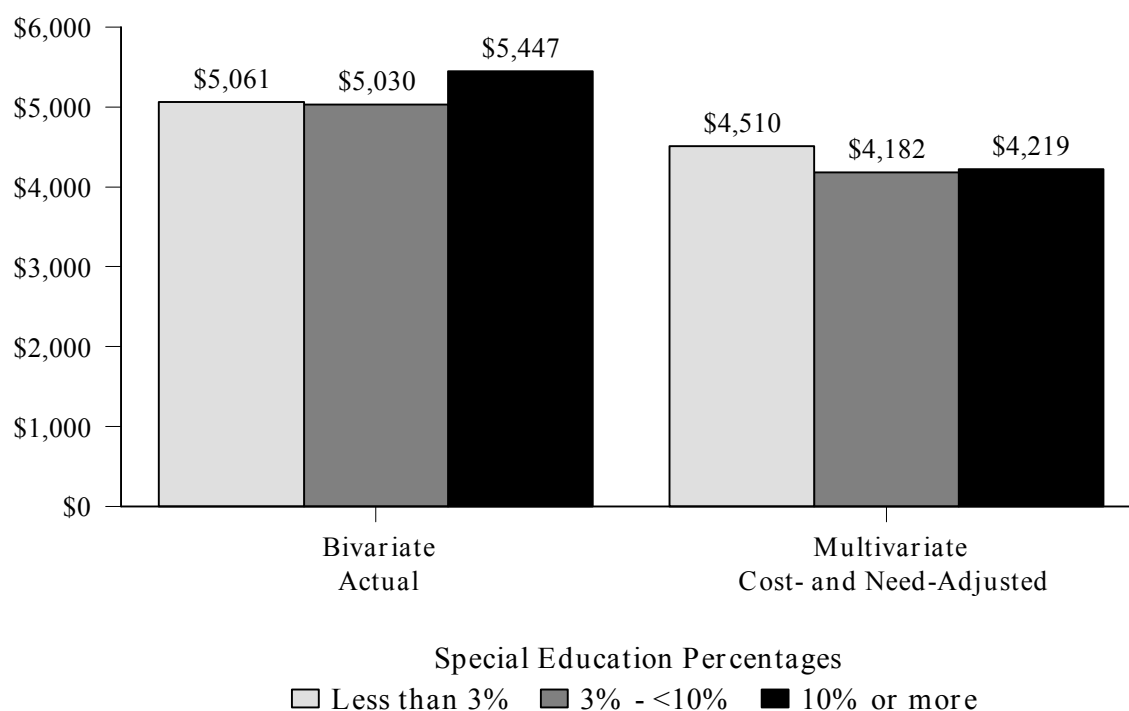
Table 3.-- Total expenditures per student by percentage of special education students

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Special Education Students					
Less than 3%	17.3	\$5,061	\$4,692	\$4,932	\$4,510
3% - <10%	44.2	5,030	4,060	5,093	4,182
10% or more	38.5	5,447	4,278	5,433	4,219

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 3.-- Actual and adjusted total expenditures per student by percentage of special education students



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

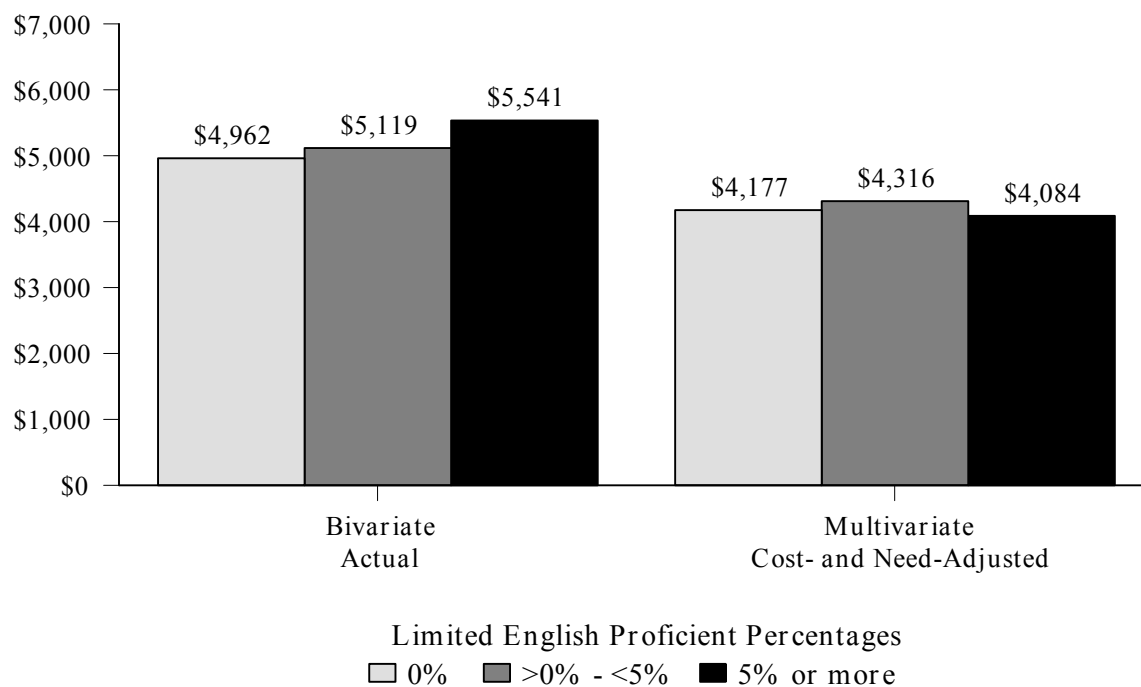
Limited English proficient (LEP) children. As shown in table 4 and figure 4, students in districts with the highest percentages of LEP students also show higher overall actual expenditures. However, on a cost- and need-adjusted basis, these districts show the lowest average expenditures. These findings are predicated on the assumption that a weight of 1.2 is a reasonably accurate reflection of the supplemental costs of serving LEP students.

Table 4.-- Total expenditures per student by percentage of limited English proficient children

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Limited English Proficient Children					
0%	9.3	\$ 4,962	\$4,333	\$5,061	\$4,177
>0% - <5%	69.0	5,119	4,308	5,234	4,316
5% or more	21.6	5,541	4,043	5,133	4,084

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 4.-- Actual and adjusted total expenditures per student by percentage of limited English proficient children

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

School-age at-risk children. This category represents the percentage of school-age children residing within district boundaries, living with a single parent who is not a high school graduate and who lives below the poverty level. Although the bivariate results shown in table 5 and figure 5 indicate lower expenditures in districts enrolling 3 to less than 5 percent and 5 percent or more at-risk children, these differentials are almost entirely explainable as the effects of other related variables, as shown in the multivariate results.

Table 5.-- Total expenditures per student by percentage of school-age at-risk children

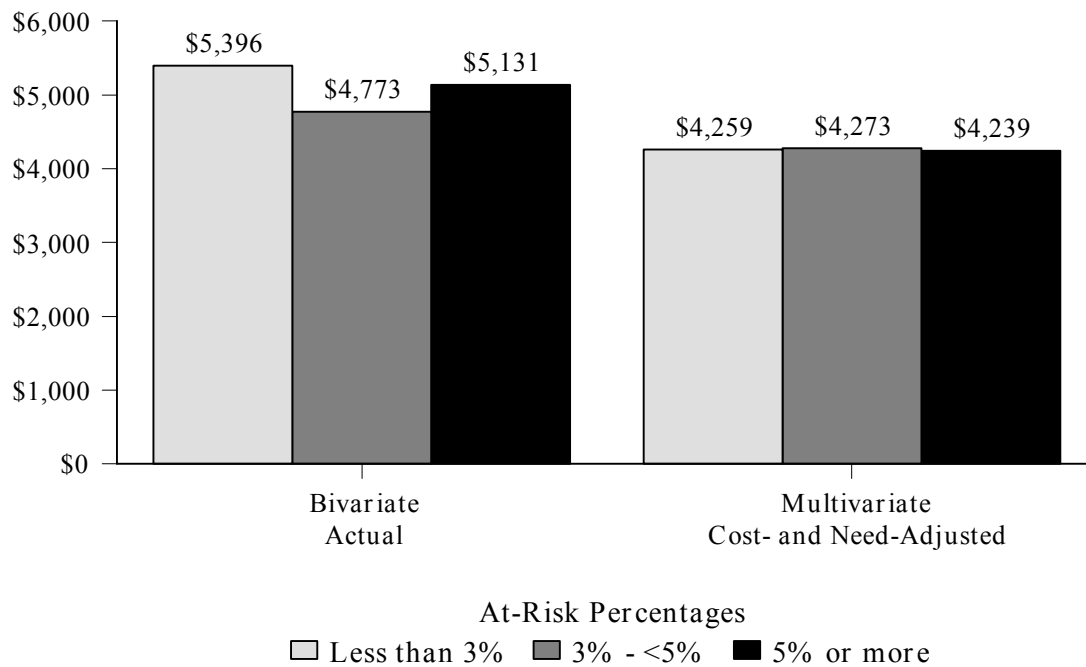
District characteristics	Percentage of enrollment	Bivariate Results		Multivariate Results	
		Actual	Cost-and-need adjusted	Unadjusted Estimates	Cost-and-need adjusted estimates
		(1)	(2)	(3)	(4)
School age at risk children					
Less than 3%	45.4	\$4,259	\$5,220	\$5,396	\$4,493
3% -- < 5%	15.4	4,773	4,045	5,223	4,273
5% or more	39.2	5,131	4,057	5,157	4,239

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

District enrollment. In actual dollars, districts spend about the same amount per student irrespective of district size. However, as shown in table 6 and figure 6, the multivariate analysis of adjusted expenditures shows expenditures per student to be highest in districts enrolling fewer than 1,000 students, other factors being equal, than in districts of all other sizes. The fact that this variation is more pronounced in the multivariate analysis shows a strong relationship between small district size and expenditures, and suggests that differences in district size may underlie some of the other relationships observed in the bivariate analysis, such as that between urbanicity and expenditures. While about one-half (52.2 percent) of the districts in the country fit into this classification, they serve only 7.1 percent of the nation's public school children.

Figure 5.-- Actual and adjusted total expenditures per student by percentage of school-age at-risk children



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

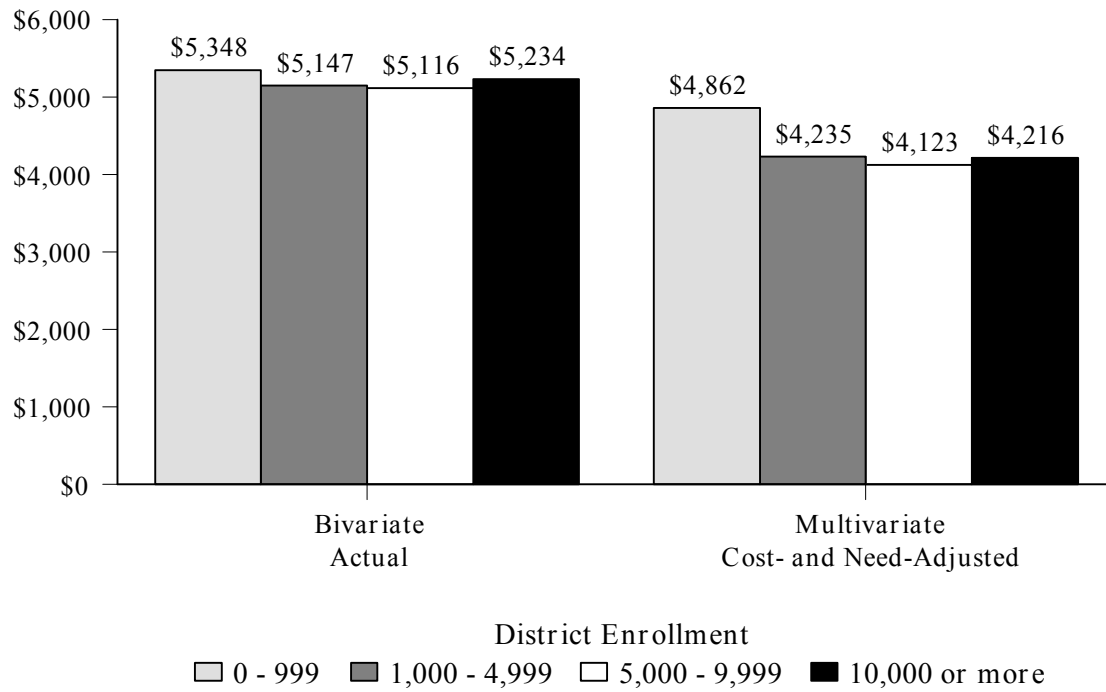
Table 6.-- Total expenditures per student by district enrollment

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
District Enrollment					
0 - 999	7.1	\$5,348	\$4,663	\$5,095	\$4,862
1,000 - 4,999	30.9	5,147	4,334	5,199	4,235
5,000 - 9,999	16.2	5,116	4,194	5,090	4,123
10,000 or more	45.8	5,234	4,155	5,120	4,216

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 6.-- Actual and adjusted total expenditures per student by district enrollment



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

District type. District type refers to the level of instruction provided in the district (i.e., whether it is an elementary, secondary, or unified district). While the vast majority of students (97 percent) are enrolled in unified districts, which serve both elementary and secondary students, a small percentage of students is enrolled in districts serving only elementary or only secondary students. Because it is more costly to serve high school students (Hertert, Busch, and Odden 1994), it is not surprising to see, as shown in table 7 and figure 7, that districts serving only high school students have higher average expenditures per student. Although actual levels of expenditure are clearly higher in elementary than in unified districts (column 1), in terms of actual buying power the differential shown in this two-way relationship diminishes substantially (column 2). Much of the variation in actual expenditures is likely due to the fact that elementary districts tend to be located in high cost areas. When all other variables included in this analysis are taken into account, as shown in columns 3 and 4, elementary district expenditures are shown to be essentially the same as for unified districts. This is surprising in that unified districts serve secondary, as well as elementary, students. Unified districts may be able to spend less by sharing administrative costs across all grade levels.

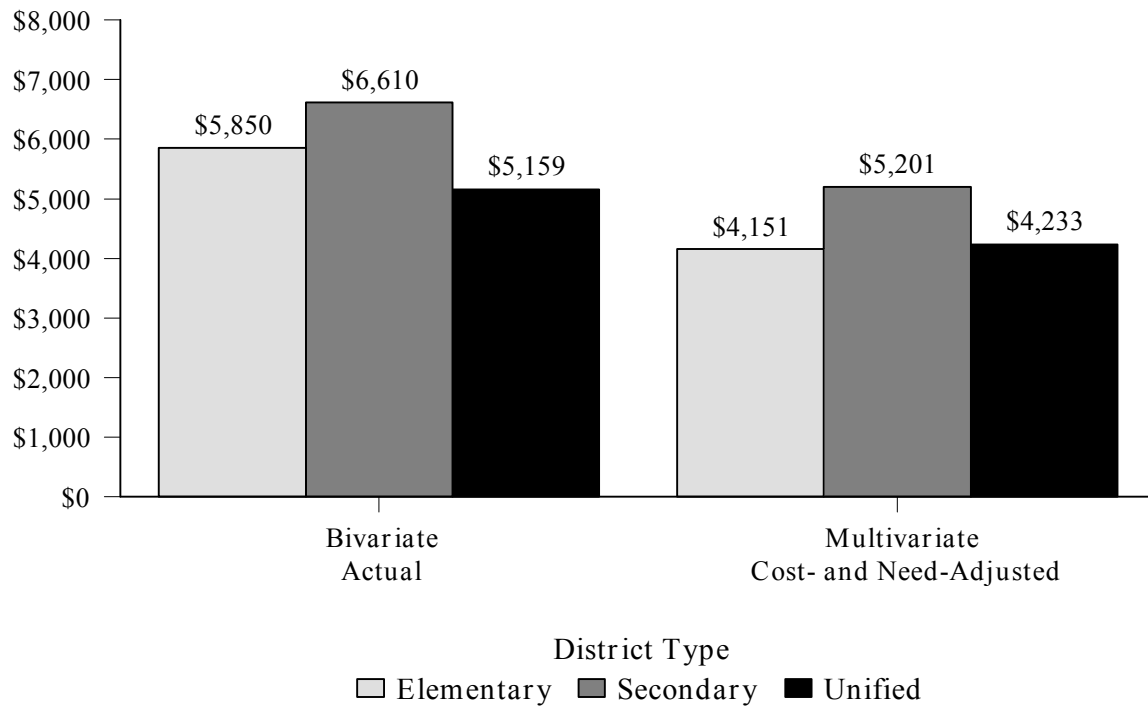
Table 7.-- Total expenditures per student by district type

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
District Type					
Elementary	0.9	\$5,850	\$4,382	\$5,102	\$4,151
Secondary	2.2	6,610	5,134	6,493	5,201
Unified	97.0	5,159	4,232	5,168	4,233

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 7.-- Actual and adjusted total expenditures per student by district type



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Detailed findings by community characteristics.

Metropolitan status. As shown in table 8, although actual expenditures per student are substantially lower in rural districts (column 1), this bivariate differential is reduced substantially when expressed in adjusted terms (column 2). This is largely due to the lower costs exhibited in rural areas. (The detailed results presented in table A3.2 show this to be predominantly a cost rather than a student-need effect.) For the multivariate analysis, while actual expenditures are shown to be somewhat smaller in the rural areas (column 3), on a fully adjusted basis they are shown to be higher than for urban or suburban districts (column 4). This suggests that most of the actual expenditure differential observed between rural and other districts is the result of other factors that are related to rural locations (e.g., district size), as well as lower costs in rural areas. (See also figure 8.)

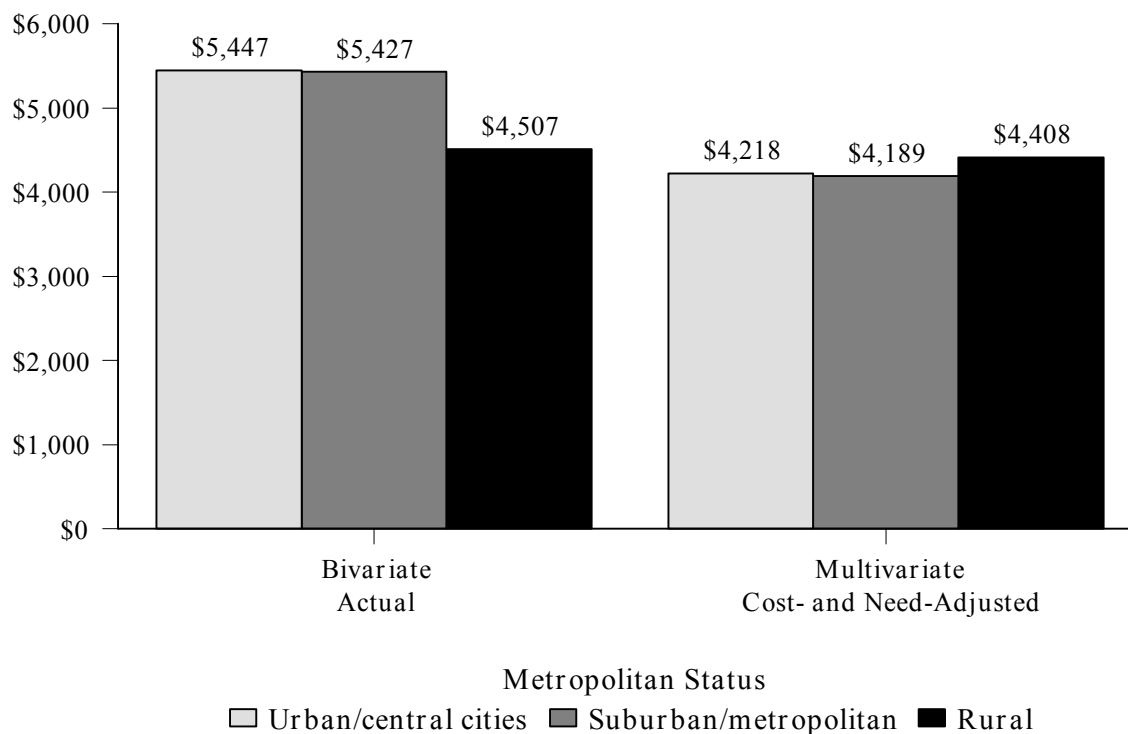
Table 8.-- Total expenditures per student by metropolitan status

Community Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Metropolitan Status					
Urban/central cities	26.9	\$5,447	\$4,195	\$5,241	\$4,218
Suburban/metropolitan	47.3	5,427	4,389	5,198	4,189
Rural	25.7	4,507	4,064	5,145	4,408

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 8.-- Actual and adjusted total expenditures per student by metropolitan status



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

Geographic region. Districts in the northeastern region of the country outspend their counterparts from all other regions by over \$2,000, although one-third of this difference is explainable in terms of different resource costs and other district characteristics. Although the South is the lowest spending region in actual dollars (table 9, column 1), in terms of buying power and when other variables are taken into account, southern districts are shown to outspend districts in the western region of the country by a substantial margin. Columns 2 through 4 show a consistent ranking in expenditures per student across the regions, with the Northeast spending the most, the Midwest second, the South third, and the West the least. (See also figure 9.)

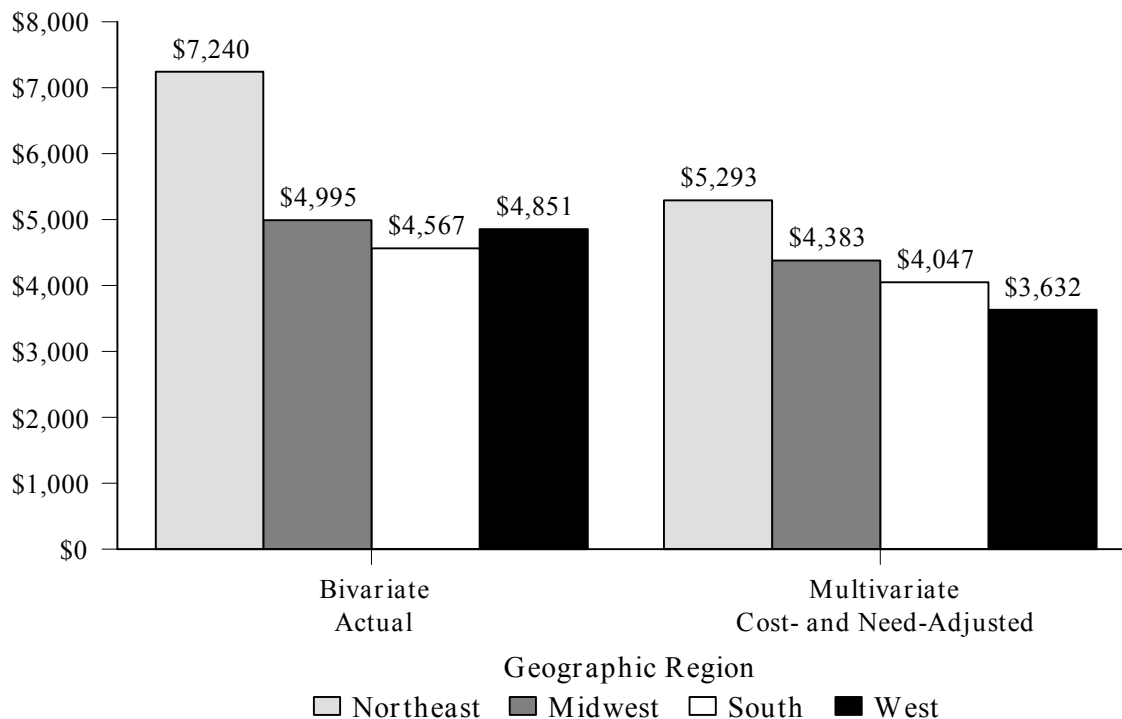
Table 9.-- Total expenditures per student by geographic region

Community Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Geographic Region					
Northeast	17.3	\$7,240	\$5,383	\$6,948	\$5,293
Midwest	24.5	4,995	4,361	5,336	4,383
South	36.3	4,567	3,948	4,708	4,047
West	22.0	4,851	3,749	4,468	3,632

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 9.-- Actual and adjusted total expenditures per student by geographic region



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set 1).

NOTE: All results are weighted by district enrollment.

Education attainment of householders. Education expenditures are greatest in communities with the most high school graduates. This is not surprising, as it would be expected that communities with higher education attainment levels would be more willing, and able, to provide local support for public education programs (Riddle 1990). As shown in table 10, roughly half of the expenditure differential between the lowest and highest education attainment groups can be explained by cost and need differences and other factors ($\$5,754 - \$4,503 = \$1,251$ [column 1]) versus $\$4,515 - \$3,953 = \$562$ [column 4]). Thus, among districts similar on other factors, those with more than 85 percent high school graduates spend \$562 more per student than those with fewer than 65 percent high school graduates, a difference of 14 percent (\$4,515 versus \$3,953). (See also figure 10.)

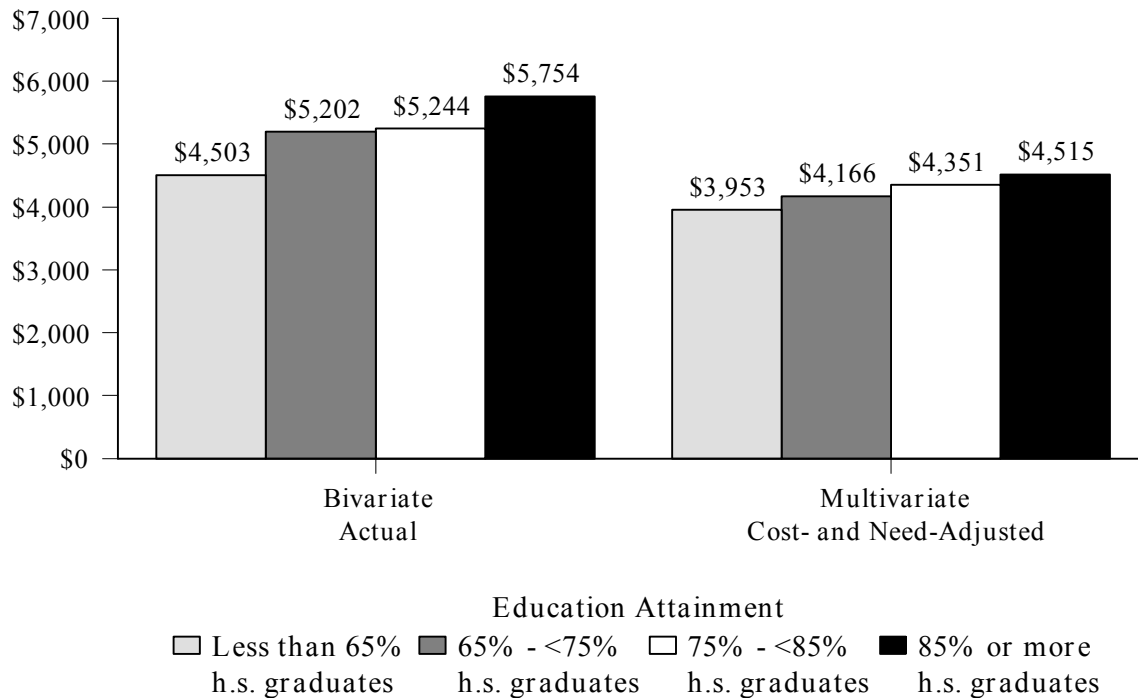
Table 10.-- Total expenditures per student by education attainment of householders

Community Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Education Attainment of Householders					
Less than 65% high school graduates	18.1	\$4,503	\$3,766	\$4,972	\$3,953
65% - <75% high school graduates	31.3	5,202	4,188	5,127	4,166
75% - <85% high school graduates	31.3	5,244	4,328	5,264	4,351
85% or more high school graduates	19.4	5,754	4,681	5,406	4,515

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 10.-- Actual and adjusted total expenditures per student by education attainment of householders



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

*Median value owner-occupied housing.*⁵ As property taxes provide an important basis of support for public education throughout the states, it is not surprising to see a positive relationship between education expenditures and housing values (table 11). This relationship is still apparent when viewed from the perspective of relative buying power (column 2) and when other related factors are taken into account (column 4). However, when other factors are taken into account and expenditures are fully adjusted, the education expenditure differential between the highest and lowest categories of housing values is reduced from \$1,716 (\$6,155 - \$4,439 [column 1]) to \$409 (\$4,401 - \$3,992 [column 4]). (See also figure 11.)

⁵ These housing values are based on homeowners' own estimates. Concerns have been expressed about the accuracy of these subjectively derived estimates. However, research found that homeowners overestimate housing values by only 6 percent and that these overestimates are unrelated to homeowner characteristics, the house, and the local market (Goodman and Ittner 1992).

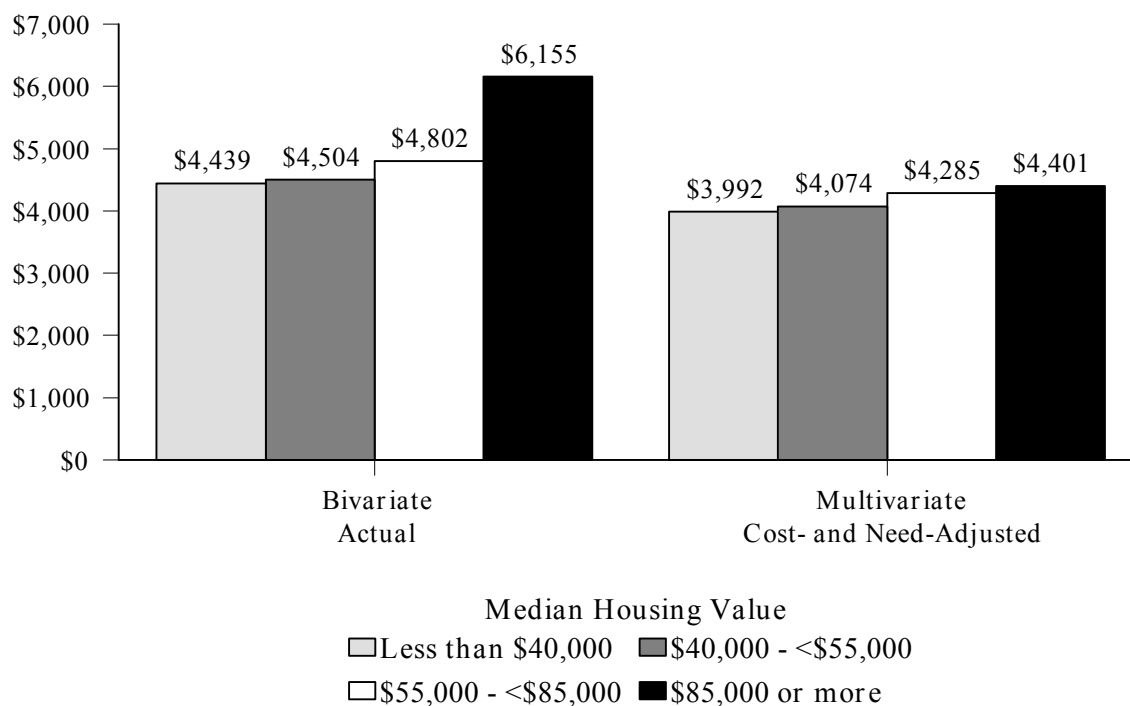
Table 11.-- Total expenditures per student by median value owner-occupied housing

Community Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Median Value Owner-Occupied Housing					
Less than \$40,000	10.8	\$4,439	\$3,895	\$4,634	\$3,992
\$40,000 - <\$55,000	20.2	4,504	3,947	4,751	4,074
\$55,000 - <\$85,000	32.5	4,802	4,157	5,074	4,285
\$85,000 or more	36.5	6,155	4,615	5,717	4,401

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 11.-- Actual and adjusted total expenditures per student by median value owner-occupied housing



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, N Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

Median household income (cost-adjusted). A positive relationship between household income and expenditures is observed in table 12. This bivariate relationship also generally holds when expenditures are considered on an adjusted basis (column 2). However, when these two variables are compared on a cost- and need-adjusted basis in the multivariate analysis (column 4), these expenditure differentials are substantially diminished. Expenditures per student for the highest income category exceeded those for the lowest income category by an average of \$186 (\$4,382 - \$4,196 from column 4). While a positive relationship between income and expenditures generally holds across this analysis, the multivariate analysis shows that this relationship is due to differences in student needs and resource costs, and to other variations included in the multivariate analysis. (See also figure 12.)

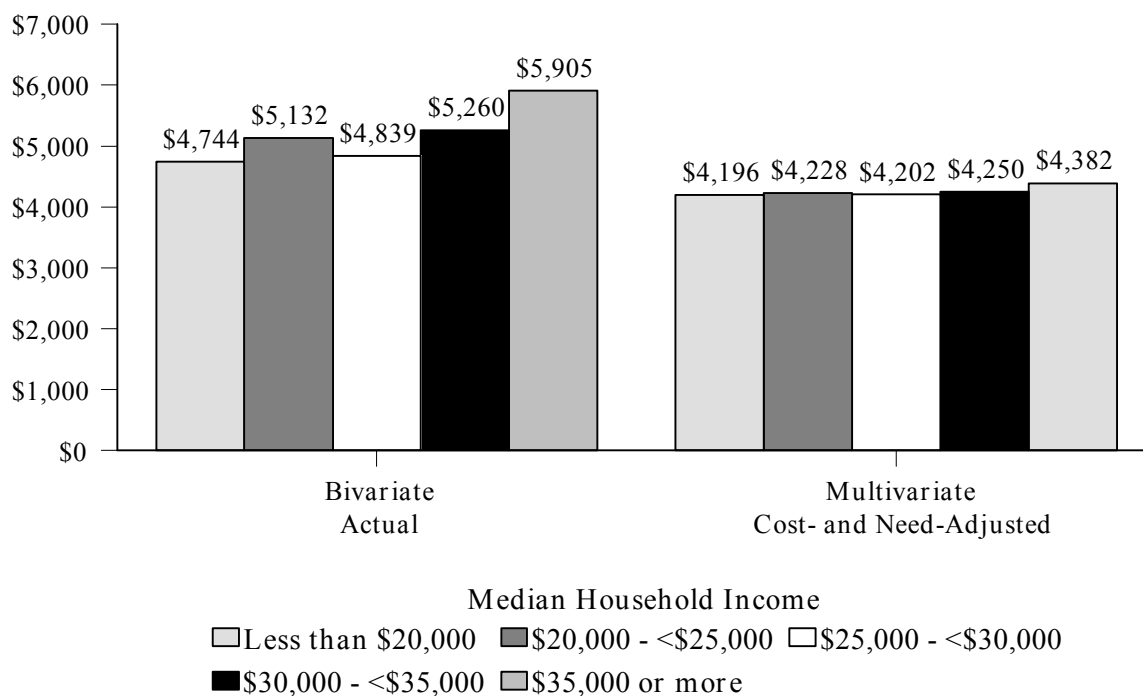
Table 12.-- Total expenditures per student by median household income (cost-adjusted)

Community Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Cost- and Need- Adjusted (2)	Unadjusted Estimates (3)	Cost- and Need- Adjusted Estimates (4)
Median Household Income					
Less than \$20,000	10.0	\$4,744	\$3,894	\$5,324	\$4,196
\$20,000 - <\$25,000	27.9	5,132	4,101	5,279	4,228
\$25,000 - <\$30,000	25.9	4,839	4,078	5,127	4,202
\$30,000 - <\$35,000	15.8	5,260	4,337	5,109	4,250
\$35,000 or more	20.5	5,905	4,792	5,175	4,382

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 12.-- Actual and adjusted total expenditures per student by median household income (cost-adjusted)



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, 1 Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

What appear to be the overall effects of the various types of adjustments on the observed expenditure patterns? One consistent effect is a reduction in the observed expenditure differential as the various adjustments are applied. For 9 of the 12 variables, the expenditure gap diminishes between the top and bottom district groups as they are transformed from their actual to fully adjusted forms. Generally, this would be expected. For example, because state and federal education aid formulas are designed to allocate more resources to districts with concentrations of students with special needs, all else equal, higher expenditures would be expected in districts with the most special needs students. Thus, it is not surprising to see the observed differential in expenditure per student drop across districts when these variations in student need are taken into account through the application of the student-need adjustments (columns 2 and 4).

Applying the resource-cost adjustments that are reflected in columns 2 and 4 also often results in reductions in observed expenditure variations across districts. Because the highest cost centers are generally heavily urbanized areas with a more substantial local tax base, they

tend to show higher education expenditures. However, because of the higher costs they face, these additional expenditures may not translate into increased purchasing power. Because the resource-cost index adjusts nominal dollars into deflated “purchasing power” dollars, the application of the resource cost index has a general tendency to show diminished adjusted expenditures in high cost areas and increased adjusted expenditures in low cost areas, which generally has an overall effect of reducing the observed differential between the highest and lowest spending districts.

Generally, the use of multivariate analysis techniques also would be expected to lead to a reduction in the size of the observed expenditure differential across districts that can be associated with any single variable. The purpose of multivariate analysis is to sort out the unique relationship between a given independent variable (e.g., percentage of students in poverty) and the dependent variable (expenditures per student) by weighing the effects of a number of related variables simultaneously. Because the bivariate analysis lumps the effect of a given variable such as poverty with all of the other variables that may be correlated with it (e.g., property wealth), the magnitude of a given effect is generally likely to appear much larger in the bivariate results than in the multivariate findings, where only the unique effect of a given variable is estimated.

How Do School Districts Serving Different Types of Students and Communities Allocate Resources Across the Categories of Instruction, Administration, and Capital Outlay?

Questions about how funds for public education are used to purchase education resources are increasingly coming to the forefront of education policy discussions (Picus 1994; Wyckoff 1992; Fischer 1990; Hentschke 1988; Kirst 1988; Ginsburg 1981). What percentage of the education dollar is used for overall administration; what percentage actually arrives at the school level; what percentage is used for direct instruction; and what percentage is used for direct services to children that go beyond the more traditional, purely instructional, function of schools? With increasing demands for improvement in the quality and quantity of education services at a time when resources for all public services are tightly constrained, there is

increasing interest in exactly how public education dollars are being used to provide education services.

To relate the questions stated above to policy alternatives, it is also critical to gain a better understanding of how resource allocation patterns vary for different types of school districts and communities. Comparable total expenditures per student in districts serving very different populations of students may result in very different levels of resources at the classroom level.

For example, concerns are sometimes expressed that despite the substantial flow of dollars to high poverty schools through the federal Chapter 1 program, the learning gap between high and low poverty schools is not closing (Sinclair and Gutmann 1990; Westat, Inc. 1992). However, if instructional services are still relatively insufficient in these schools, or if the education atmosphere is inadequate due to underfunded health, social, and security services, it may not be realistic to expect enhanced education outcomes from this program. Because these analyses of resource allocation patterns within districts are somewhat exploratory within the context of this overall examination of spending in education across the nation, there has been no attempt to control for other district characteristics in the expenditure analysis presented in this section (i.e., to conduct multivariate analyses). Plans for additional analyses of this type are currently being developed.

Summary of findings.

- *Student/teacher ratios vary substantially by district size and region of the country.* In both actual and adjusted terms, the average ratio is over 20 percent larger in the nation's largest districts (10,000 students or more) as opposed to the smallest (less than 1,000 students).⁶ In actual terms, the average student/teacher ratio in the smallest districts is 15.1 as compared to 18.8 in the largest. These differences are even more pronounced by geographic region of the country, with

⁶ Student/teacher ratios are only adjusted for student-need variations. Because this resource is expressed in actual rather than dollar terms, resource-cost adjustments are inappropriate for this measure.

the Northeast showing an average student/teacher ratio of 15.6 as compared to 21.9 for the West. The Midwest and South show average student/teacher ratios falling between these two values, at 17.3 and 17.1, respectively.

[Note: The following expenditure results were obtained only through bivariate analysis and do not control for other district characteristics. As such, they should be interpreted with greater caution than the results obtained through multivariate analysis.]

- *Districts serving relatively high percentages of students who are in poverty, who are minority, and who are limited English proficient all allocate greater percentages of their available funds for core instructional purposes than do districts serving lower percentages of these same groups of students.*
- *Capital outlay is generally the area most sensitive to variation in total expenditures per student by type of district compared to the categories of instruction and administration.⁷ Districts with less to spend tend to focus on direct instruction and administration at the expense of capital expenditures.*
- *The differential between high and low poverty districts is especially pronounced in the area of capital outlay, with the lowest poverty districts showing expenditures that exceed those of the highest poverty districts by 76.7 percent (\$795 versus \$450 per student).*
- *Percentage allocations for administrative services are largest in smaller districts, in rural districts, and where housing values and median income are lowest.*

⁷ *For the purposes of this study, capital outlay includes land purchases, building repair and construction, and expenditures on equipment. In subsequent analyses, these categories of capital expenditure might be analyzed in more detail. It should also be noted that these analyses report actual expenditures. While annualized costs are generally considered more appropriate in analyses of capital items, these cost data were not available.*

- *The previously reported finding that districts in the northeastern section of the country spend more than the other three regions (the Midwest, the South, and the West) is especially true in the area of administration and support, in which districts in the Northeast outspend their western counterparts by 65.0 percent (\$1,371 versus \$831 per student).*

Detailed findings by district characteristics. The expenditure tables presented in this section show cost- and need-adjusted percentage expenditures in columns 1 through 3 and cost- and need-adjusted dollars in columns 4 through 6. Tables of bivariate and multivariate results of unadjusted and student-need-adjusted student/teacher ratios and corresponding graphic presentations follow for some of the variables presented in this section. Student/teacher ratios are included in this section because they represent a more concise definition of allocations for core instructional purposes, and they represent real, as opposed to fiscal, resources. Although only those variables with the most pronounced relationship with student/teacher ratios are graphically displayed in the following section, ratios for all of the variables included in the analysis are reported in tables A7 and A12 of Appendix A.

Minority enrollment. As shown in table 13, districts enrolling the largest percentages of minority students also spend a greater percentage of the funds available to them for core instructional purposes. These districts also allocate a lower percentage of funds for administration and capital outlay. In terms of adjusted expenditures, the only systematic relationship shown with minority enrollment is that the low minority districts spend more on general administration and support.

Table 13.-- Percentage and total adjusted expenditures by function, by percentage of minority enrollment

District Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Minority Enrollment						
Less than 5%	59.8	26.6	13.6	\$2,624	\$1,166	\$599
5% - <20%	60.4	25.6	14.0	2,629	1,112	609
20% - <50%	60.2	25.6	14.2	2,524	1,073	593
50% or more	63.2	25.2	11.6	2,592	1,035	476

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

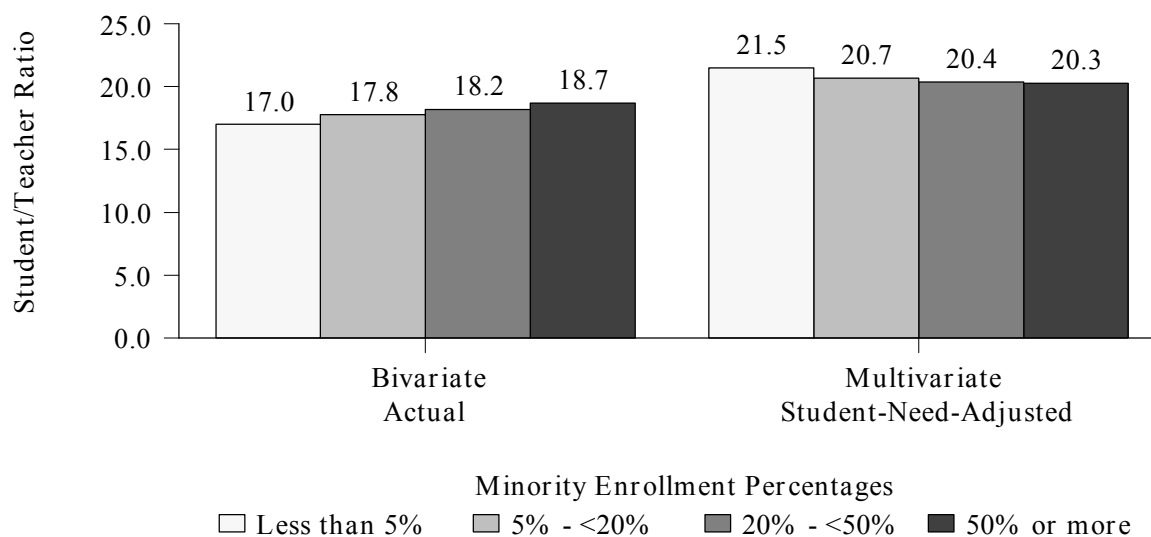
As minority enrollment increases, so does the student/teacher ratio in both actual and student-need-adjusted terms (table 14, columns 1 and 2). The multivariate results (columns 3 and 4) show the opposite pattern, which is similar to the overall expenditure results by minority enrollment (table 1). The student-need-adjusted ratios are important because they reflect the differing composition of the student in a class as well as overall class size. For example, what is considered an appropriate student/teacher ratio is generally dependent on the special needs of the students being served. An appropriate number of students per teacher for students with disabilities, or for students who do not speak English, generally is considered to be different than that for a class with no students with these kinds of special needs. (See also figure 13.)

Table 14.-- Student/teacher ratios by percentage of minority enrollment

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need-Adjusted (2)	Unadjusted Estimates (3)	Student-Need-Adjusted Estimates (4)
Minority Enrollment					
Less than 5%	21.9	17.0	19.1	18.7	21.5
5% - <20%	26.5	17.8	20.2	18.0	20.7
20% - <50%	25.7	18.2	21.0	17.7	20.4
50% or more	25.9	18.7	22.2	17.5	20.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 13.-- Actual and adjusted student/teacher ratios by percentage of minority enrollment

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

School-age children in poverty. Schools in high poverty districts have less to spend, and they sacrifice capital outlay first, allocating a larger percentage of their expenditures to core instruction. As shown in table 15, districts with higher percentages of students in poverty allocate larger percentages of total expenditures to core instructional activities (62.6 percent versus 59.4 percent). In the area of capital expenditures, the lowest poverty districts outspend the highest poverty districts by 76.7 percent (\$795 versus \$450) in adjusted dollars.

Table 15.-- Percentage and total adjusted expenditures by function, by percentage of school-age children in poverty

District Characteristic	Percentage Expenditures for			Cost- and Need-Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
School-Age Children in Poverty						
Less than 5%	59.4	25.4	15.3	\$3,092	\$1,322	\$795
5% - <15%	60.3	25.3	14.4	2,587	1,084	618
15% - <25%	61.1	26.0	13.0	2,444	1,039	520
25% or more	62.6	26.3	11.1	2,531	1,063	450

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

This type of finding raises some important questions regarding the difference between rich and poor schools. The percentages of total expenditures allocated to core instruction and administration and support do not vary as much as expenditures on grounds, buildings, and equipment. If these expenditures are viewed as providing more seating for the football stadium, tennis courts, and swimming pools, many would not consider them to be critical instructional expenditures and therefore might argue that expenditure differentials in these areas are likely to have relatively little impact on instructional outcomes. However, if they are viewed as resulting in serious gaps in such items as computers and science laboratory equipment between rich and poor schools, or if they are viewed in the form of dilapidated and poorly maintained buildings, the concerns become more difficult to dismiss and seem to

reinforce the images portrayed in books describing differences between rich and poor schools (e.g., *Savage Inequalities*). Without more detailed information, it is impossible to say to what extent these capital differences represent important gaps in critical education resources.

The student/teacher ratios shown in table 16 and figure 14 below also accentuate the differing resource levels between schools in high and low poverty districts. While the actual ratios are only smaller in the lowest poverty districts, on a student-need-adjusted basis, student/teacher ratios are shown to rise steadily with increased school poverty. The multivariate student-need-adjusted student/teacher ratio results show a differential of 9.3 percent (19.4 versus 21.2) between the lowest and the highest poverty districts: This is much smaller than the adjusted core instruction expenditure differential noted for these two groups (22.2 percent). This shows that although higher poverty districts spend a substantially smaller amount of core expenditures per student than low poverty districts, student/teacher ratios do not differ to the same degree.

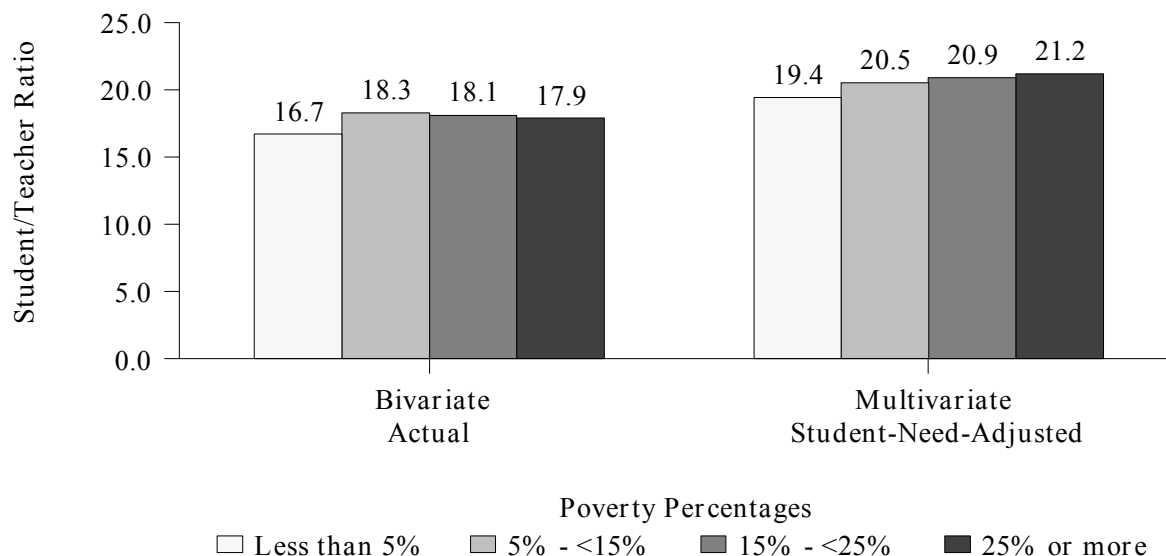
Table 16.-- Student/teacher ratios by percentage of school-age children in poverty

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need-Adjusted (2)	Unadjusted Estimates (3)	Student-Need-Adjusted Estimates (4)
School-Age Children in Poverty					
Less than 5%	11.3	16.7	18.4	17.1	19.4
5% - <15%	36.1	18.3	20.7	17.9	20.5
15% - <25%	26.4	18.1	21.0	18.1	20.9
25% or more	26.1	17.9	21.3	18.2	21.2

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 14.-- Actual and adjusted student/teacher ratios by percentage of school-age children in poverty



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990

Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Limited English proficient (LEP) children. As shown in table 17, students in districts with the highest percentages of LEP students also allocate larger percentages of expenditure to core instructional services; this comes at the expense of administration and capital outlay. In terms of expenditures per student, the districts with the largest percentages of LEP students spend 2.7 percent more (\$2,608 versus \$2,539) on core instruction, 20.0 percent less (\$940 versus \$1,175) on administration, and 20.0 percent less (\$495 versus \$619) on capital outlay.

Table 17.-- Percentage and total adjusted expenditures by function, by percentage of limited English proficient children

District Characteristic	Percentage Expenditures for			Cost- and Need-Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Limited English Proficient Children						
0%	58.6	27.1	14.3	\$2,539	\$1,175	\$619
>0% - <5%	60.2	26.3	13.6	2,593	1,131	584
5% or more	64.5	23.3	12.2	2,608	940	495

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Bivariate results in table 18 (columns 1 and 2) show that student/teacher ratios rise steadily with percentage LEP. On a student-need-adjusted basis, this ratio is 25.9 percent larger (23.3 versus 18.5) for districts in communities in which the largest percentages of LEP children reside than for their counterparts with the lowest percentages of LEP children. This pattern is not as pronounced in the multivariate results (figure 15).

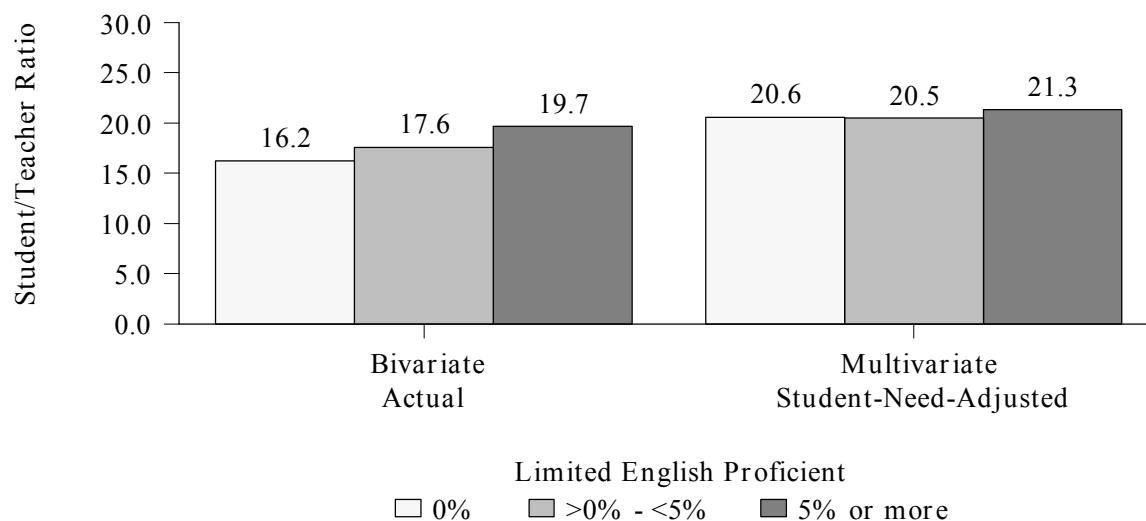
Table 18.-- Student/teacher ratios by percentage of limited English proficient children

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need-Adjusted (2)	Unadjusted Estimates (3)	Student-Need-Adjusted Estimates (4)
Limited English Proficient Children					
0%	9.3	16.2	18.5	18.0	20.6
>0% - <5%	69.4	17.6	20.2	17.8	20.5
5% or more	21.3	19.7	23.3	18.3	21.3

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 15.-- Actual and adjusted student/teacher ratios by percentage of limited English proficient children



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

School-age at-risk children. Similar to districts serving students in poverty, districts serving the largest percentages of students at-risk have somewhat fewer dollars to spend overall, as shown in table 19. They also allocate a larger percentage of their expenditures to core instructional services (61.8 percent versus 60.2 percent) at the expense of capital outlay (12.1 percent versus 14.3 percent). However, despite the greater outlay for instruction as a percentage of total expenditures, districts serving the highest percentages of at-risk students still spend less in adjusted dollars for core instructional services. The greatest area of disparity is again in capital outlay, where districts serving the highest percentages of at-risk students spend only 76.4 percent (\$492 versus \$644) as much as districts with the lowest percentages of at-risk students. (See tables A7.1 and A12 for student/teacher ratios by percentage of school-age at-risk children.)

Table 19.-- Percentage and total adjusted expenditures by function, by percentage of school-age at-risk children

District Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
School-Age At-Risk Children						
Less than 3%	60.2	25.5	14.3	\$2,704	\$1,145	\$644
3% - <5%	61.1	25.7	13.3	2,470	1,038	537
5% or more	61.8	26.0	12.1	2,509	1,056	492

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

District enrollment. As shown in table 20, the nation's smallest districts spend the largest percentage of expenditures on administration. This trend seems to be in keeping with the administrative economies that would be expected to be associated with scale. The existence of such administrative economies also seems to be supported by the adjusted expenditure data. Although the small districts spend more in all three areas, expenditure differentials by district size are less pronounced in the area of core instruction.

Smaller districts also have lower student/teacher ratios. As shown in table 21 and figure 16, in actual terms, the student/teacher ratio in the largest districts is 24.5 percent higher than in the smallest ones (18.8 versus 15.1). In multivariate student-need-adjusted terms, the student/teacher ratio is 20.9 percent higher (21.4 versus 17.7).

Table 20.-- Percentage and total adjusted expenditures by function, by district enrollment

District Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
District Enrollment						
0 - 999	57.4	27.5	15.0	\$2,678	\$1,284	\$701
1,000 - 4,999	60.7	26.3	12.9	2,631	1,142	561
5,000 - 9,999	62.4	25.3	12.4	2,616	1,060	518
10,000 or more	61.2	25.1	13.7	2,543	1,043	569

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations

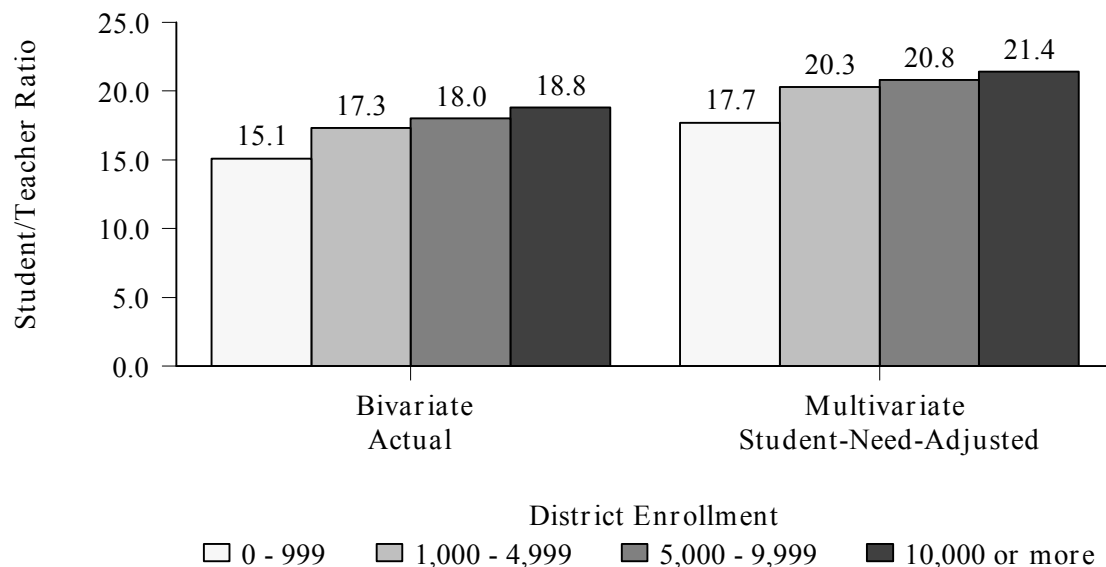
Table 21.-- Student/teacher ratios by district enrollment

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need- Adjusted (2)	Unadjusted Estimates (3)	Student-Need- Adjusted Estimates (4)
District Enrollment					
0 - 999	7.2	15.1	17.3	15.3	17.7
1,000 - 4,999	30.9	17.3	19.6	17.6	20.3
5,000 - 9,999	16.2	18.0	20.6	18.1	20.8
10,000 or more	45.7	18.8	22.0	18.5	21.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to missing categorization information for some observations.

Figure 16.-- Actual and adjusted student/teacher ratios by district enrollment



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

District type. Since elementary, secondary, and unified school districts are quite distinct from one another, and since the sample of elementary and secondary districts is quite small in relation to the vast majority of unified districts, it is not surprising to see that resource allocation patterns vary across these three types of districts (table 22). Secondary districts spend a larger percentage of expenditures on core instruction, unified districts a higher percentage on general administration, and elementary districts substantially more on capital outlay. In terms of adjusted expenditures per student, the secondary districts spend the most in the first two areas, with the elementary districts spending 74.3 percent more than their unified counterparts on capital outlay (\$978 versus \$561). (See tables A7.1 and A12 for student/teacher ratios by district type.)

Table 22.-- Percentage and total adjusted expenditures by function, by district type

District Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
District Type						
Elementary	57.4	20.2	22.3	\$2,517	\$ 887	\$978
Secondary	62.7	23.7	13.6	3,221	1,217	696
Unified	60.9	25.8	13.3	2,578	1,093	561

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Detailed findings by community characteristics.

Metropolitan status. Urban districts tend to allocate a larger percentage of expenditures to instruction, the rural districts more to administration, and the suburban districts more to capital outlay (table 23). The biggest differential among these three types of districts appears to be in the area of capital outlay, where the suburban districts outspend their counterparts by approximately 25 to 31 percent.

Urban and suburban districts also have larger student/teacher ratios than their rural counterparts in actual terms (18.3 versus 17.0). As shown in table 24, this differential is greatest between urban and rural districts in student-need-adjusted terms (10.2 percent, 21.6 versus 19.6). In multivariate student-need-adjusted terms, suburban districts have higher student/teacher ratios than their urban and rural counterparts (figure 17).

Table 23.-- Percentage and total adjusted expenditures by function, by metropolitan status

Community Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Metropolitan Status						
Urban/central cities	62.9	25.4	11.7	\$2,640	\$1,066	\$489
Suburban/metropolitan	60.1	25.3	14.7	2,636	1,110	643
Rural	60.5	26.9	12.6	2,459	1,092	513

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to missing categorization information for some observations.

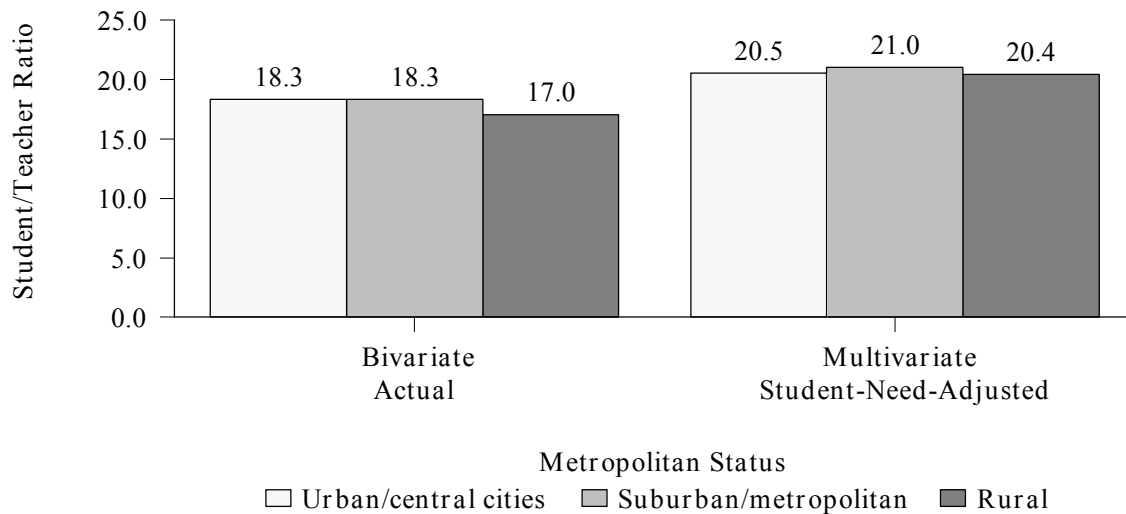
Table 24.-- Student/teacher ratios by metropolitan status

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need- Adjusted (2)	Unadjusted Estimates (3)	Student-Need- Adjusted Estimates (4)
Metropolitan Status					
Urban/central cities	26.7	18.3	21.6	17.7	20.5
Suburban/metropolitan	47.4	18.3	20.7	18.2	21.0
Rural	25.9	17.0	19.6	17.7	20.4

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 17.-- Actual and adjusted student/teacher ratios by metropolitan status



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

Geographic region. As shown in table 25, public education expenditures in the Northeast well outdistance the other regions of the country. Conversely, the expenditure patterns in the West are the lowest and are somewhat distinctive from those of the other regions. Although the western states have less to spend overall, by using a greater percentage of their funds for core instruction, their expenditures in this area are comparable with districts in the Midwest and South. In adjusted dollars, the Northeast outspends the next highest region, the Midwest, by nearly 30 percent in the area of core instruction (\$3,339 versus \$2,579), by 13.7 percent for administration (\$1,371 versus \$1,206), and by 16.8 percent in the area of capital outlay (\$673 versus \$576).

Just as expenditure differentials are striking across regions, so are the differences in student/teacher ratios (see table 26). In actual terms, the Northeast stands out from the Midwest and South, which stand out from the West. In multivariate student-need-adjusted terms, the West stands alone at a ratio of 25.1 as compared to an average of about 19 for the other three regions (figure 18).

Table 25.-- Percentage and total adjusted expenditures by function, by geographic region

Community Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Geographic Region						
Northeast	62.0	25.5	12.5	\$3,339	\$1,371	\$673
Midwest	59.1	27.7	13.2	2,579	1,206	576
South	59.6	26.5	13.9	2,354	1,045	549
West	64.3	22.2	13.6	2,410	831	508

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

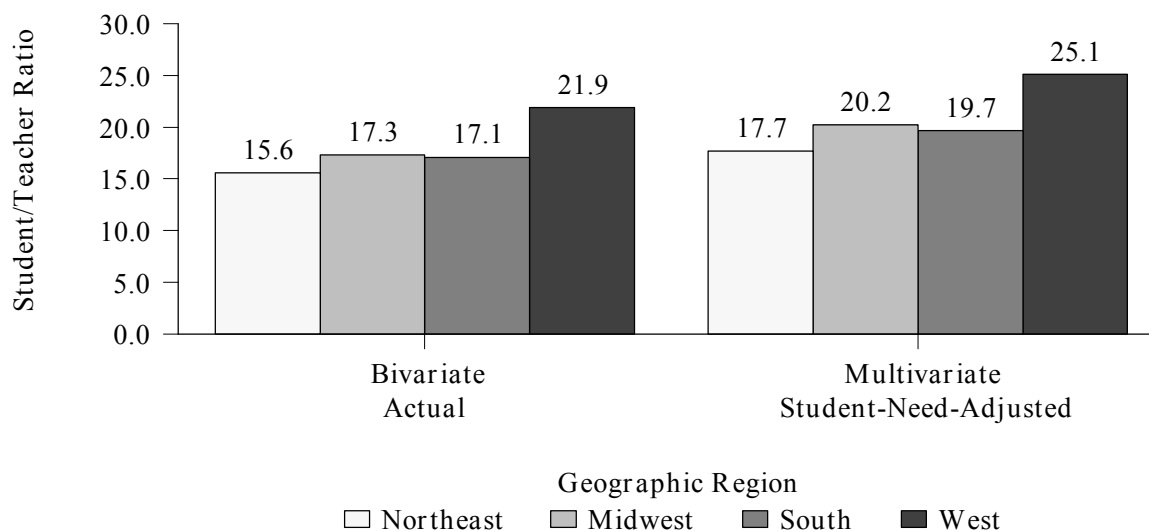
Table 26.-- Student/teacher ratios by geographic region

District Characteristic	Percentage of Enrollment	Bivariate Results		Multivariate Results	
		Actual (1)	Student-Need- Adjusted (2)	Unadjusted Estimates (3)	Student-Need- Adjusted Estimates (4)
Geographic Region					
Northeast	16.9	15.6	17.8	15.4	17.7
Midwest	24.6	17.3	19.4	17.7	20.2
South	36.4	17.1	20.0	17.0	19.7
West	22.1	21.9	25.5	21.7	25.1

SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Figure 18.-- Actual and adjusted student/teacher ratios by geographic region



SOURCE: U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

Median household income (cost-adjusted). As shown in table 27, districts in communities with the highest cost-adjusted median household incomes have the highest adjusted public education expenditures per student. Although these districts tend to spend about the same percentage of their funds as others on core instruction, they allocate a higher percentage of their funds to capital outlay. In terms of adjusted expenditures, districts in communities in the highest adjusted income category outspend their lowest income counterparts by 19.0 percent in the area of instruction (\$2,868 versus \$2,410), 10.7 percent for administration (\$1,188 versus \$1,073), and 79.1 percent for capital outlay (\$736 versus \$411). The spending differential in the area of capital outlay increases steadily as the categories of median household income increase. For the two other areas of expenditure, the biggest differences are between the highest income communities and all others. (See tables A7.2 and A12 for student/teacher ratios by median household income [cost adjusted].)

Table 27.-- Percentage and total adjusted expenditures by function, by median household income (cost-adjusted)

Community Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Median Household Income (cost-adjusted)						
Less than \$20,000	61.9	27.6	10.6	\$2,410	\$1,073	\$411
\$20,000 - <\$25,000	62.0	26.2	11.9	2,541	1,074	486
\$25,000 - <\$30,000	61.1	25.7	13.2	2,490	1,049	539
\$30,000 - <\$35,000	60.0	25.2	14.8	2,603	1,091	643
\$35,000 or more	59.8	24.8	15.4	2,868	1,188	736

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Median value owner-occupied housing. Although low wealth (housing) districts spend less per student on education, their general administration and support expenditures are slightly higher than in the higher wealth districts, as shown in table 28. This finding reinforces concerns that administrative costs are higher in low wealth districts due to the added need for such support services as security, maintenance, and repair. Spending for core instruction and capital outlay tend to suffer in the low wealth districts. (See tables A7.2 and A12 for student/teacher ratios by median value owner-occupied housing.)

Table 28.-- Percentage and total adjusted expenditures by function, by median value owner-occupied housing

Community Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Median Value Owner-Occupied Housing						
Less than \$40,000	61.1	28.3	10.7	\$2,378	\$1,102	\$415
\$40,000 - <\$55,000	61.4	27.4	11.2	2,423	1,081	443
\$55,000 - <\$85,000	59.7	26.0	14.4	2,480	1,080	597
\$85,000 or more	61.7	24.1	14.3	2,847	1,110	658

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

Education attainment of householders. Districts in communities with the highest percentages of high school graduates spend more in all three categories of expenditure. However, as shown in table 29, the bulk of the extra spending is in capital outlay and core instruction, not in general administration and support. (See tables A7.2 and A12 for student/teacher ratios by education attainment of householders.)

Table 29.-- Percentage and total adjusted expenditures by function, by education attainment of householders

Community Characteristic	Percentage Expenditures for			Cost- and Need- Adjusted Expenditures for		
	Core Instruction (1)	General Admin. and Support (2)	Capital Outlay (3)	Core Instruction (4)	General Admin. and Support (5)	Capital Outlay (6)
Education Attainment of Householders						
Less than 65% high school graduates	62.2	26.8	11.0	2,347	1,013	416
65% - <75% high school graduates	61.5	26.2	12.3	2,576	1,096	516
75% - <85% high school graduates	60.4	25.8	13.8	2,613	1,117	598
85% or more high school graduates	60.0	24.1	15.9	2,808	1,128	745

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment. Percentages may not add to 100 due to rounding and missing categorization information for some observations.

How Do Local, State, and Federal Revenues Vary for School Districts Serving Different Types of Students and Communities?

Our national constitution leaves public education under the authority of the states. In response, all 50 state constitutions contain clauses describing the rights of its school-age citizens to a public education. Whereas public education was funded primarily from local sources until the last 30 years, state contributions have gradually increased over time. Although the balance between local and state revenues varies considerably across the states, in school year 1989-90, state funds for public education across the nation exceeded those from local sources (47.3 percent versus 46.6 percent, Office of Educational Research and Improvement 1994). The expanding state role came as a result of greater demands for funding equalization, increased recognition of the supplemental education needs of certain student populations, and greater realization of the limitations of property taxes as a primary vehicle for supporting education.

The federal government has always been a limited partner in the area of public education, with a revenue share of 6 percent in fiscal year 1990. Chapter 1 of the Elementary and Secondary Education Act (ESEA) of 1965, which was a key component of President Johnson's war on poverty, was the first major effort to supplement public elementary and secondary education funding at the federal level. A second major federal program providing

support to public education, which is of particular importance to this analysis, is the Individuals with Disabilities Education Act (IDEA). In keeping with the role that the federal government has assumed in support of public education, both of these major programs target special populations of students. Chapter 1 of ESEA targets federal funds to districts serving students in poverty, while IDEA provides supplemental funding for special education students.

The primary roles of local, state, and federal sources have always differed somewhat. Local funds have traditionally been thought of as providing the basic foundation of general education support. With increased emphasis on equity and adequacy issues across the states, state funding formulas have aimed to enhance funding equalization in the state and to ensure the provision of some level of adequate or appropriate services. Federal funding sources are almost exclusively targeted toward special needs, to ensure the provision of services for special categories of students.

Given these distinctive local, state, and federal roles, how are different types of school districts and communities supported by local, state, and federal funding sources? Where do federal dollars go? Are greater levels of federal funds found in districts serving high percentages of students in poverty, as intended? To what extent do state funds provide an equalizing effect, and how does this vary by type of community and the students who reside there? How do these three funding sources interact in various settings?

Summary of findings.

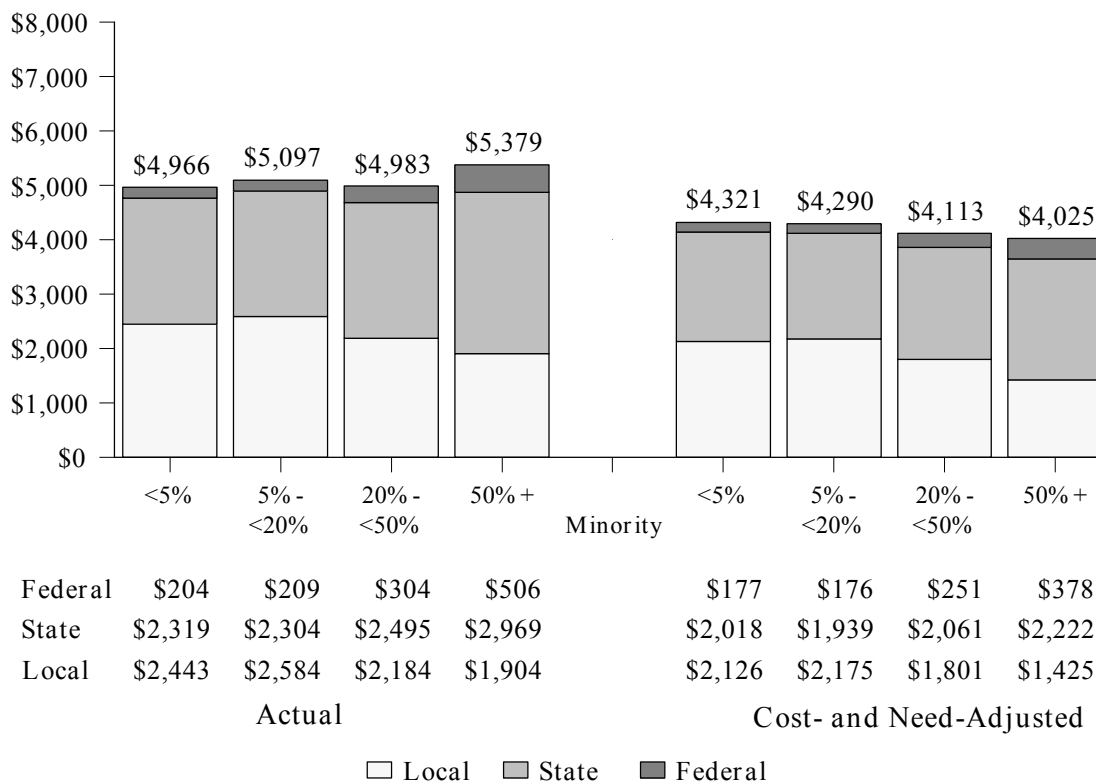
- *The amount of local support for public education rises with the wealth and socioeconomic condition of the community.*
- *State funds are the primary equalizing force in public education resource allocations. Although this is in keeping with the expected state role, overall the degree of adjustment from state sources appears insufficient to fully offset the impact of local wealth.*

- *Although state and federal allocations are larger in absolute terms in districts with large numbers of special education, poverty, and LEP students, it appears that these additional funds may be insufficient to offset the supplemental costs of serving these students.*

Detailed findings by district characteristics.

Minority enrollment. Because minority students are located disproportionately in urban areas where costs are high, the adjusted numbers are especially appropriate for differentiating between local, state, and federal purchasing power as percentage minority changes. The highest minority districts show the lowest level of funds from local sources and the highest level of funds from state and federal aid programs. In adjusted terms, local funds drop substantially from \$2,126 in districts with the lowest minority enrollment to \$1,425 in districts with the highest minority enrollment, while the amount of state funding only increases somewhat with minority enrollment. Although there are considerably more federal funds in high minority districts, total revenues are the lowest. (See figures 19 and 20.)

Figure 19.-- Local, state, and federal revenue shares by percentage of minority enrollment



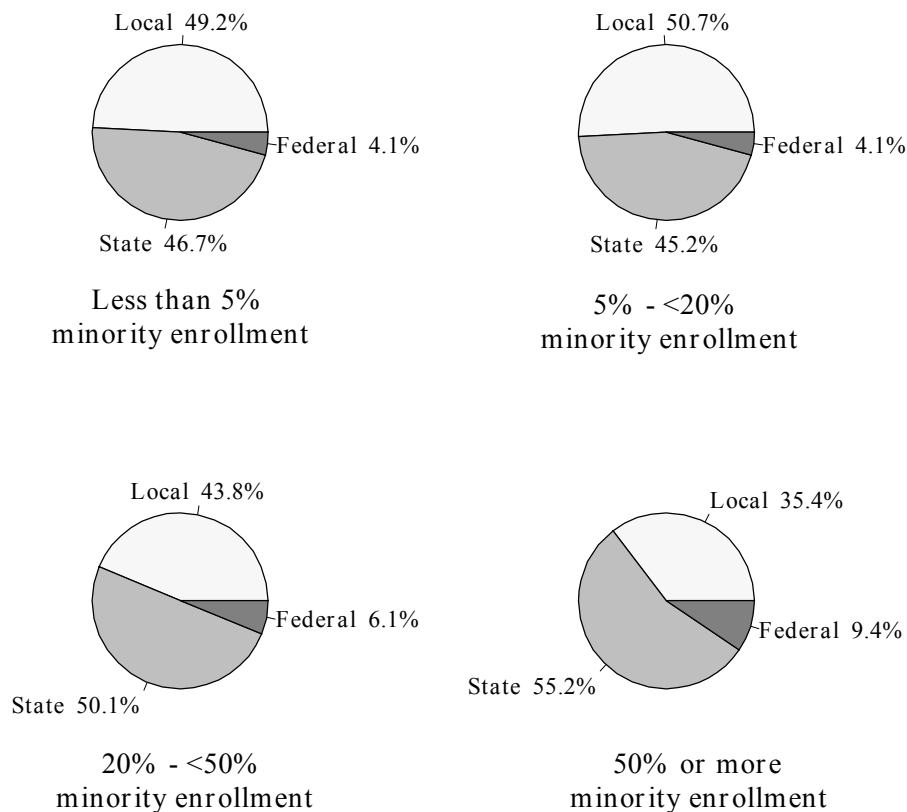
SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

School-age children in poverty. As wealthy communities are better able, and perhaps more inclined, to provide local revenues in support of public education services, it is not surprising to see a substantial negative relation between local revenues per student and the percentage of school-age children in poverty. In both actual and adjusted terms, local revenues per student for districts with low percentages of students in poverty are more than double those for districts in the highest poverty category.

Across the nation, state revenues are allocated in a way that offsets the substantial disparities found in local funding levels. However, while state funding sources clearly act as a counterbalance to varying levels of local funding, these sources do not fully offset the local

funding level s. As shown in figure 21, education funds from state and local sources

Figure 20.-- Actual local, state, and federal revenue shares by percentage of minority enrollment

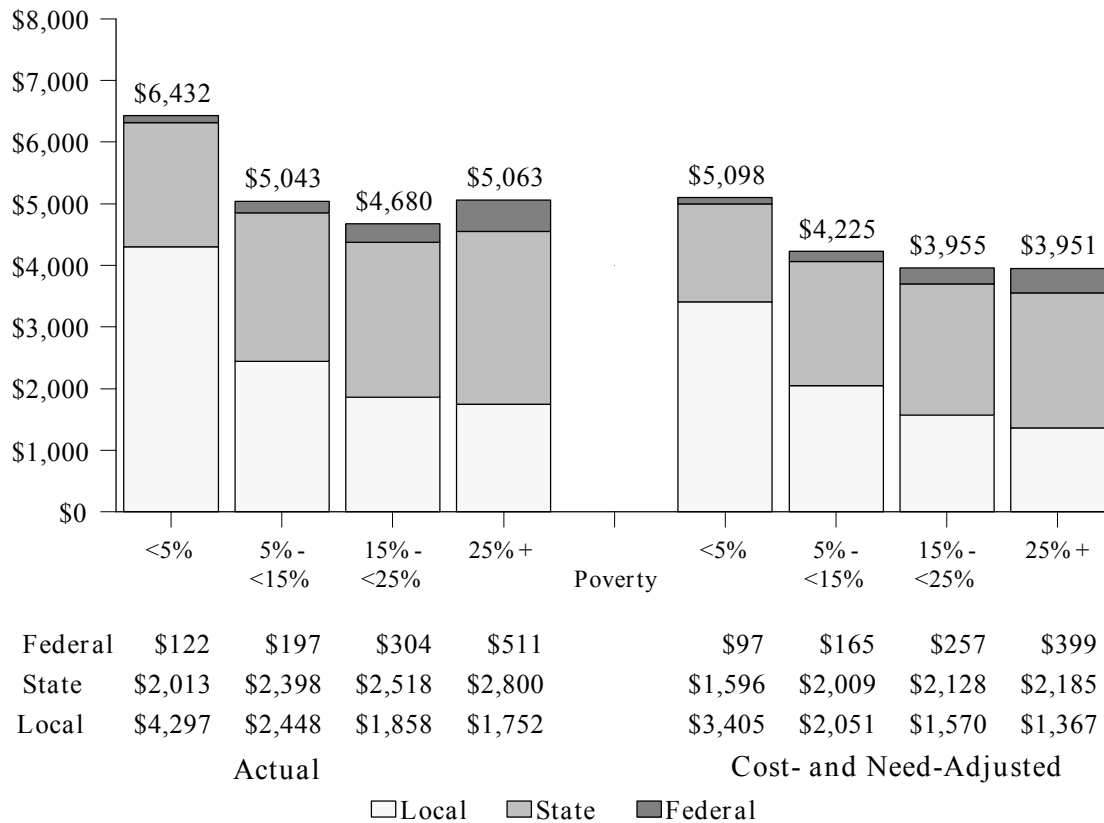


SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data.
NOTE: All results are weighted by district enrollment.

in the lowest poverty category of districts exceed funding in districts enrolling the highest percentages of children in poverty by 38.6 percent in actual terms (\$6,310 versus \$4,552) and by 40.8 percent in adjusted dollars (\$5,001 versus \$3,552).

In percentage terms, federal funding allocations have a much stronger equalizing influence against differences in poverty. Federal funds in high poverty districts exceed those in low poverty districts by more than a multiple of four (figure 22). This is not surprising, as the major federal education funding program is poverty driven. However, because these federal allocations are relatively small, overall funding differentials of 27 percent in actual terms (\$5,063 versus \$6,432) and 29 percent in adjusted terms (\$3,951 versus \$5,098) between high and low poverty districts remain (figure 21).

Figure 21.-- Local, state, and federal revenue shares by percentage of school-age children in poverty



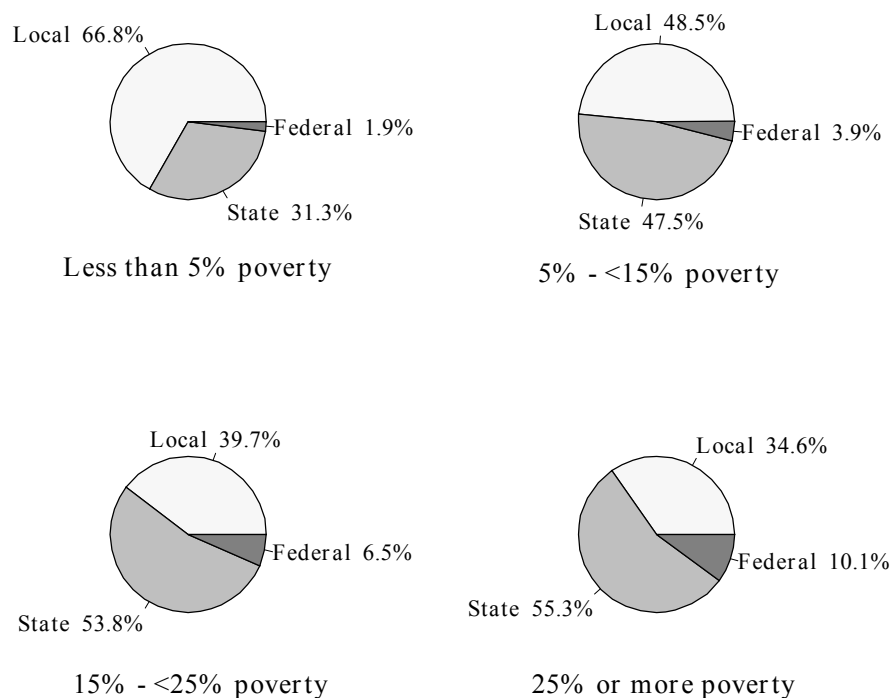
SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Although local revenues provide two-thirds of the total support received in low poverty districts, local revenues constitute about only one-third of total funding in high poverty districts (see figure 22). As poverty increases, the state funding share rises from 31.3 to 55.3 percent, while federal funding jumps from less than 1.9 percent to 10.1 percent.

Special education students. Although average state dollars per student are some what

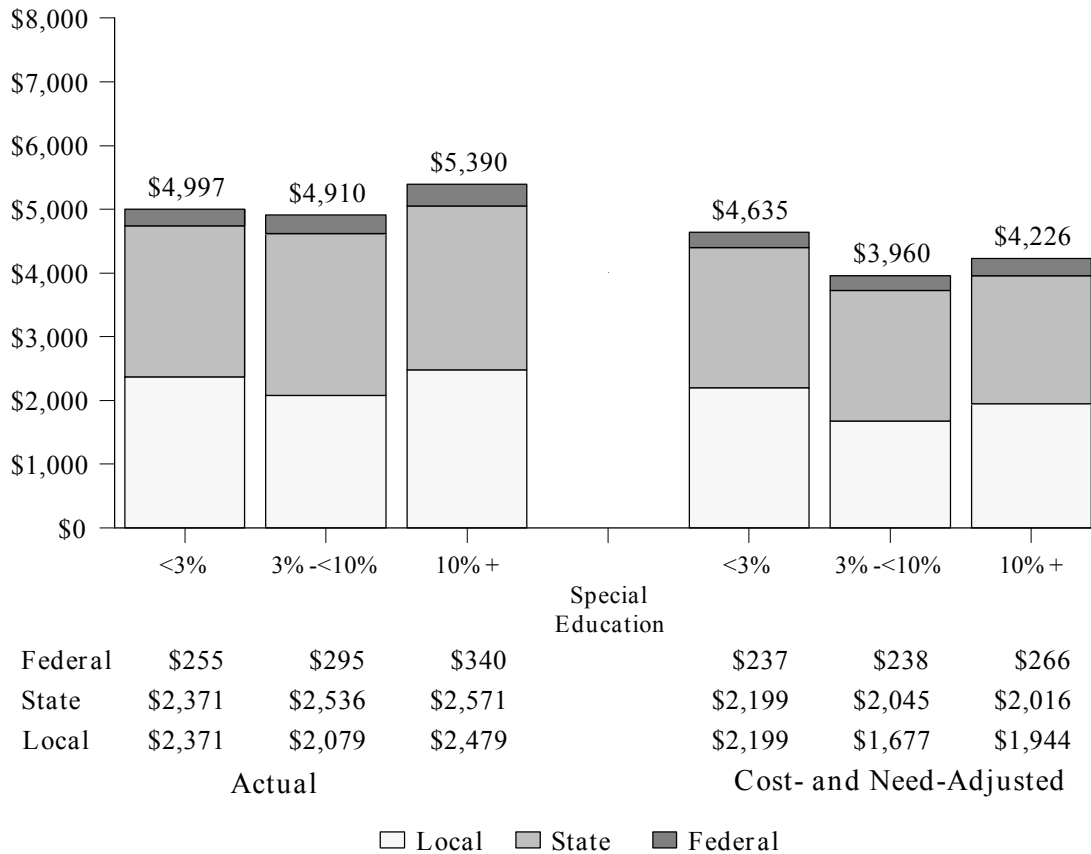
Figure 22.-- Actual local, state, and federal revenue shares by percentage of school-age children in poverty



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

higher in districts with high percentages of special education students, the opposite occurs in adjusted terms (figure 23). Since all of the states have supplemental funding programs for special education students, a positive relationship between percentage special education and state revenues is not surprising. The fact that this trend is reversed in adjusted terms, however, suggests that these supplemental state funds may not be sufficient to offset the supplemental costs of these services. State funds do not fully compensate the need ratio of 2.3 for special education students used in this study.

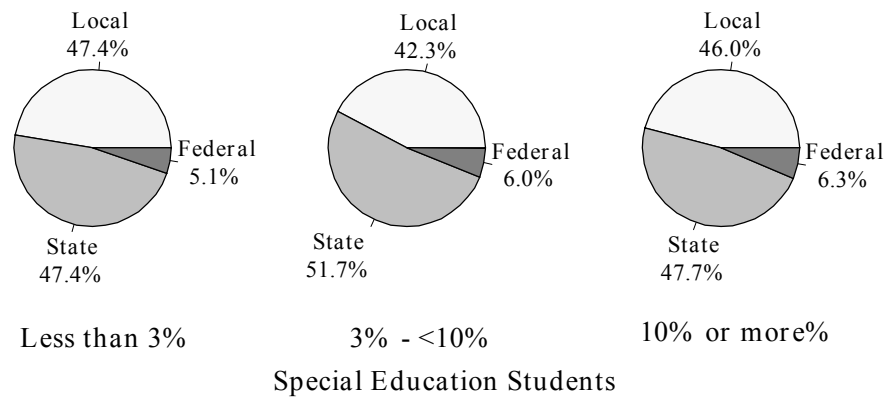
Figure 23.-- Local, state, and federal revenue shares by percentage of special education students



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
 NOTE: All results are weighted by district enrollment.

Of course, the federal government also has a program designed to assist with supplemental special education costs. Although federal special education funds are less than the amount of state dollars set aside for these purposes, this analysis suggests that federal funds may be more responsive to changes in special education student identification rates across districts. This is shown by the fact that in the adjusted analysis, federal dollars per student rise with percentage special education, while state dollars per student decline. The greater responsiveness of federal dollars may be due to the fact that federal special education funding is driven solely by the identification rate, while most state formulas are affected by such other factors as the degree of severity associated with the students' conditions. Because the number of severely disabled students may not increase proportionately with overall increases in the percentage of identified students, state formulas may be less sensitive to fluctuation in overall counts of students with disabilities.

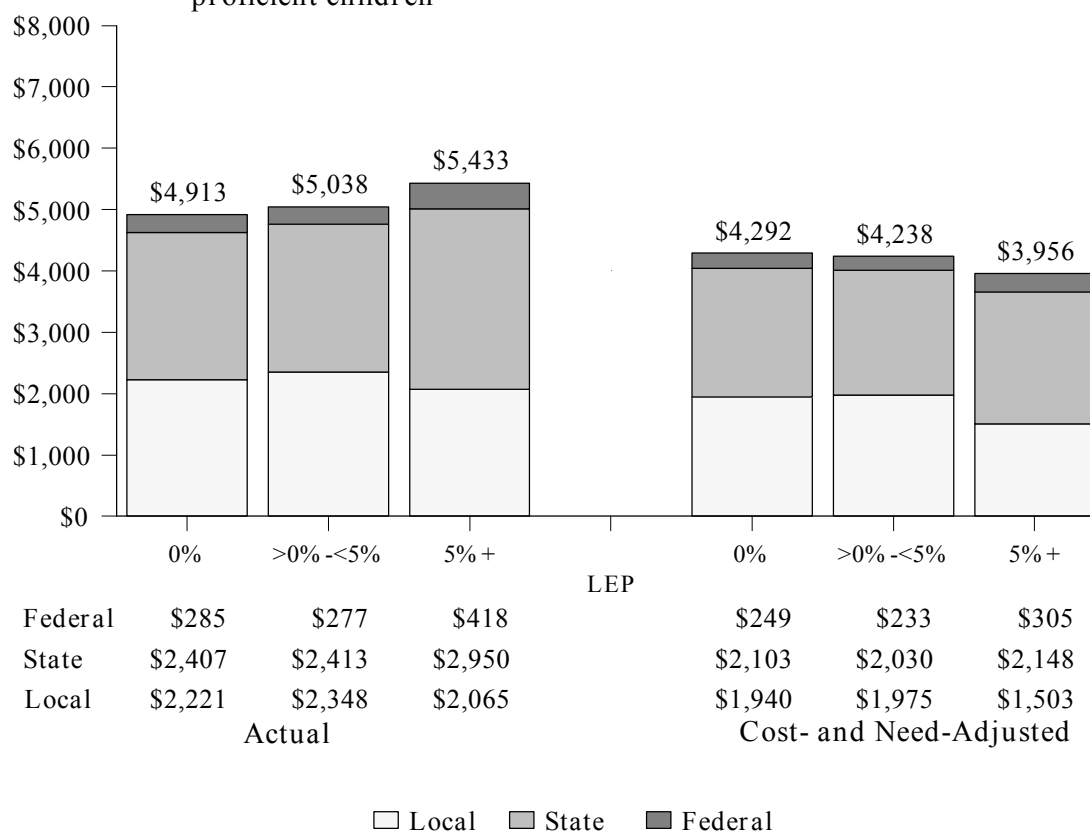
Figure 24.-- Actual local, state, and federal revenue shares by percentage of special education students



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data.
NOTE: All results are weighted by district enrollment.

Limited English proficient (LEP) children. As shown in figures 25 and 26, districts with the highest percentages of LEP students receive somewhat lower levels of local revenues and somewhat higher levels of state revenues. In most cases, however, large revenue differentials are only shown for the districts enrolling over 5 percent LEP students (21.6 percent of all students are in these districts). The federal revenue differential is larger for these districts than in those with fewer LEP students both in actual and adjusted terms. This trend reflects the federal role of providing supplemental support to students with special learning needs.

Figure 25.-- Local, state, and federal revenue shares by percentage of limited English proficient children

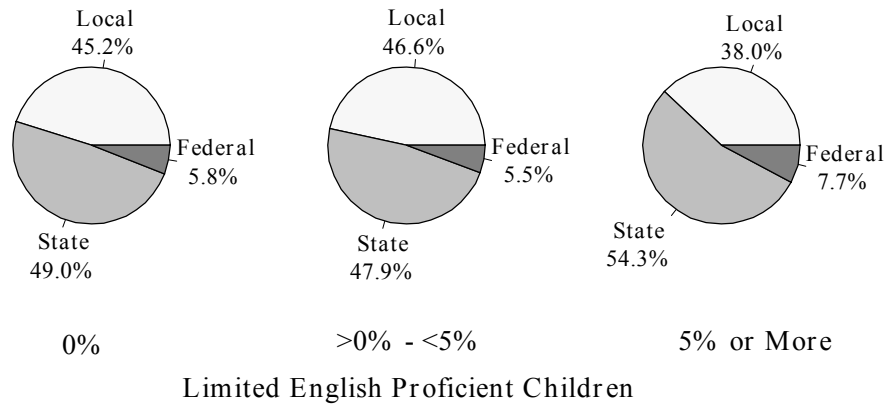


SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

School-age at-risk children. Similar to the situation in districts serving students in poverty, local revenues are lower and state and federal revenues are higher in districts with

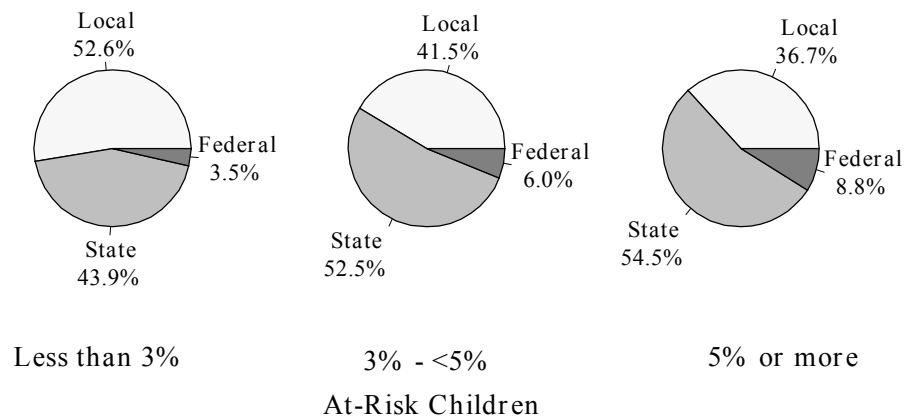
Figure 26.-- Actual local, state, and federal revenue shares by percentage of limited English proficient children



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

larger percentages of students at risk (figures 27 and 28). Federal dollars are more than twice as plentiful in districts with the highest percentages of students at risk as compared to districts with the lowest percentages of at-risk students (\$444 versus \$186 in actual dollars). State dollars are 17.9 percent more in actual terms and 11.8 percent greater in adjusted dollars.

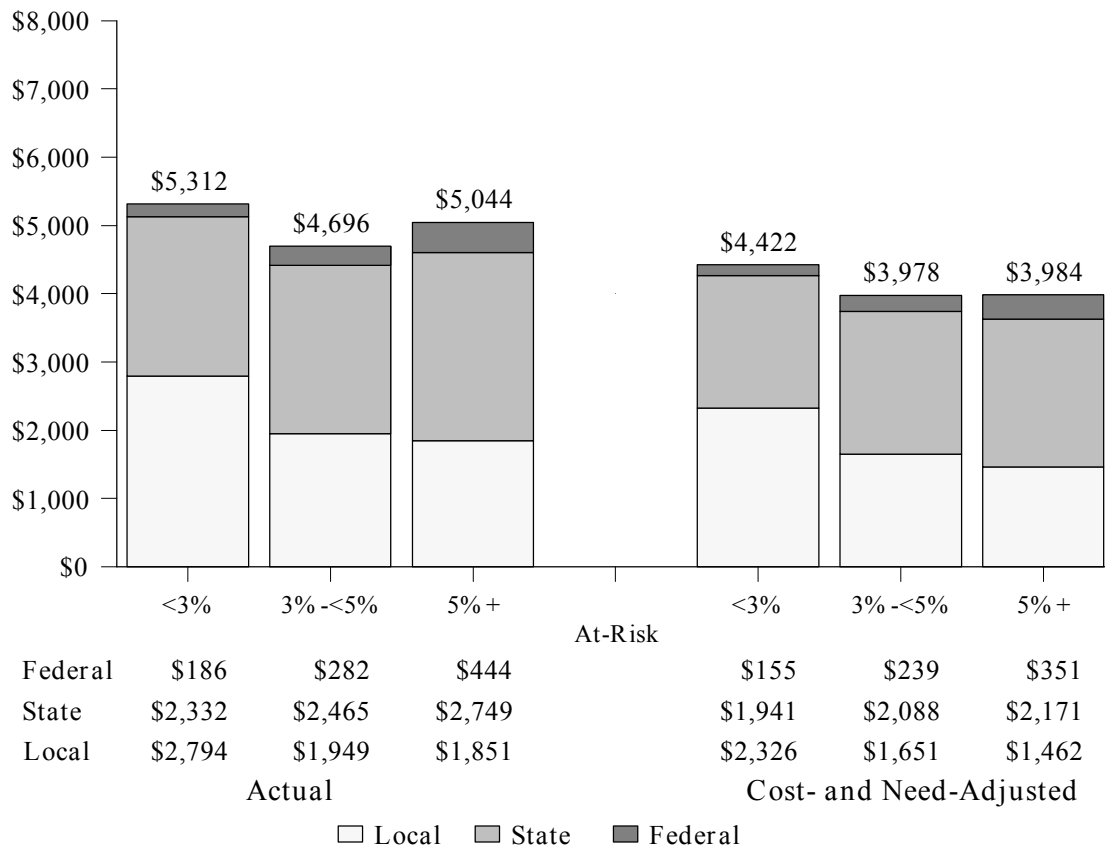
Figure 28.-- Actual local, state, and federal revenue shares by percentage of school-age at-risk children



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

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Figure 27.-- Local, state, and federal revenue shares by percentage of school-age at-risk children

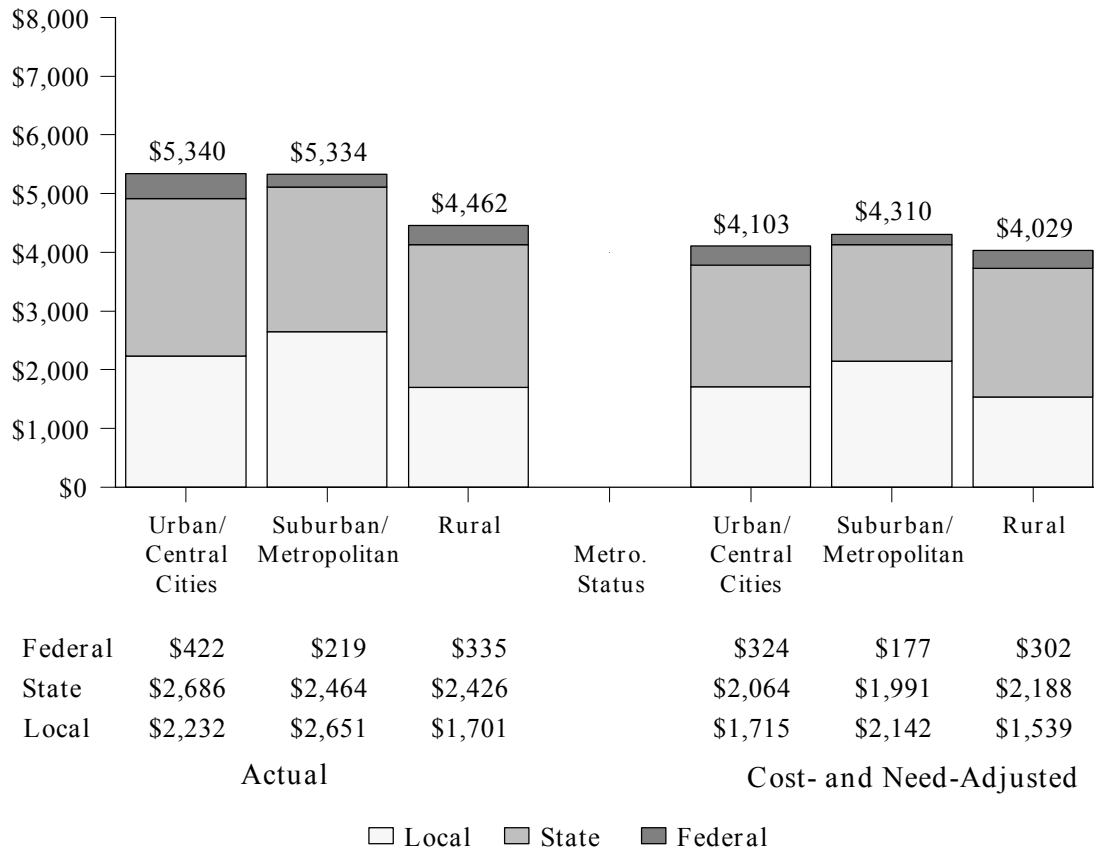


SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

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tropolitan status. In percentage terms, suburban districts receive more support from local sources than other districts, while rural districts receive more support from state sources and urban districts receive more federal support than other districts. The rural districts are also fairly large recipients of federal funds in relation to their suburban counterparts. While the suburban districts receive somewhat less state and federal funds, in adjusted dollars, they more than make up for it through local resource differentials. Overall, the suburban districts receive the greatest levels of adjusted revenues, while the urban districts receive the most when viewed in terms of actual dollars. (See figures 29 and 30.)

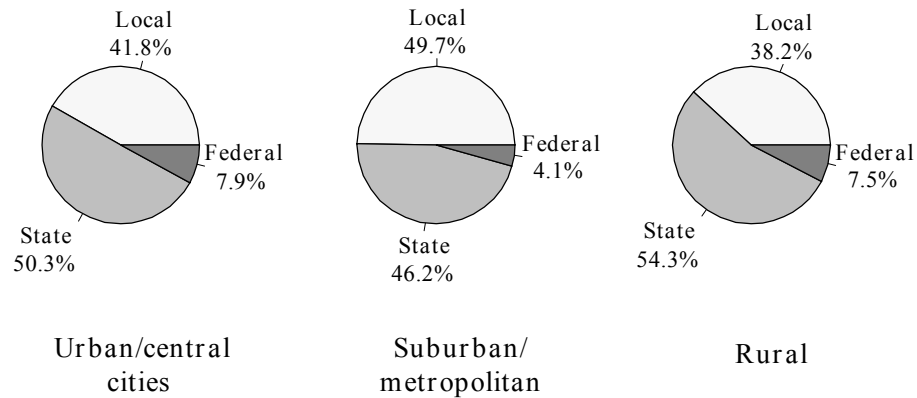
Figure 29.-- Local, state, and federal revenue shares by metropolitan status



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

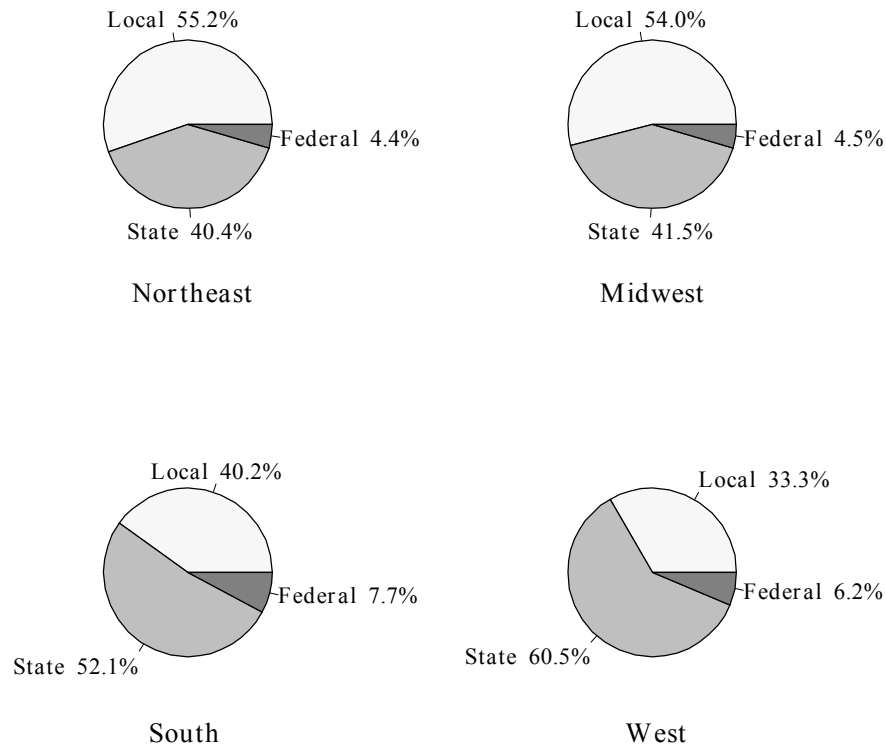
Geographic region. As overall revenues differ so greatly across the four regions of the country (revenues in the Northeast exceeding the next most highly funded region by over \$2,000 per student in actual dollars and nearly \$1,000 in adjusted terms), it is interesting to trace these large differentials by revenue source. As shown in figures 31 and 32, very different patterns of support are observed across the regions. For example, it is interesting to note that the West, with the lowest overall adjusted revenues per student, receives the greatest share of support from state sources.

Figure 30.-- Actual local, state, and federal revenue shares by metropolitan status



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data.
NOTE: All results are weighted by district enrollment.

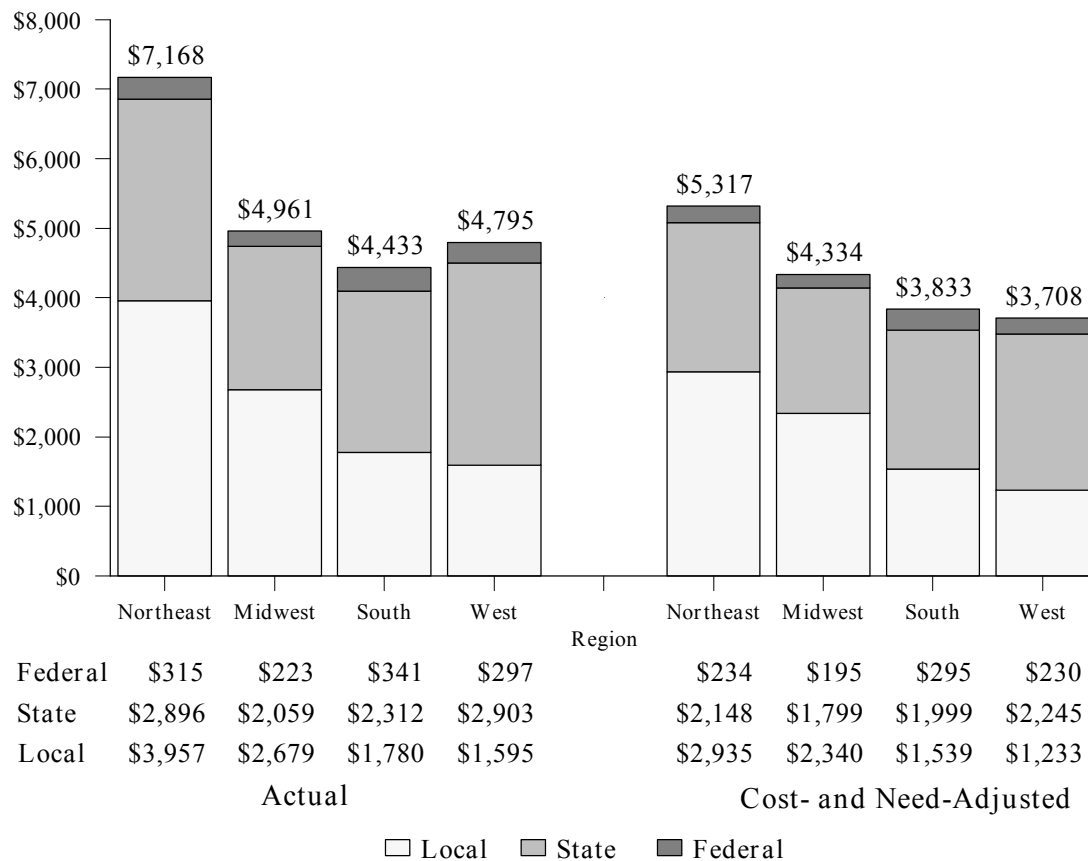
Figure 32.-- Actual local, state, and federal revenue shares by geographic region



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics.
NOTE: All results are weighted by district enrollment.

The major source of the overall revenue differential is in the provision of local funds for education. The West and the South fall well behind the Midwest and the Northeast in this

Figure 31.-- Local, state, and federal revenue shares by geographic region



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

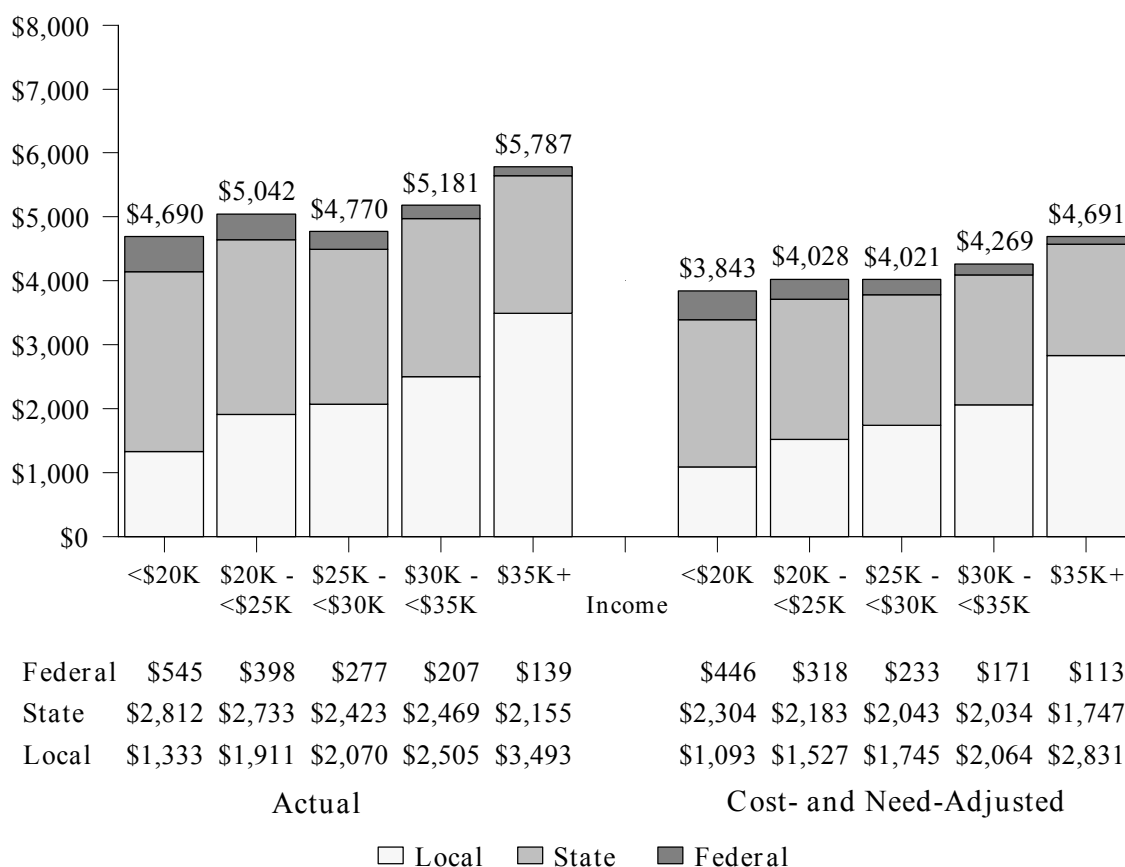
NOTE: All results are weighted by district enrollment.

regard, with the average local contribution in the West equalling only 42 percent (\$1,233 versus \$2,935) of the average local contribution in the Northeast in adjusted terms. Thus, while the state contribution in the West appears much larger than for the Northeast in percentage terms (60.5 percent versus 40.4 percent), the dollar differential is really quite small (\$2,245 versus \$2,148) in adjusted dollars. The South is clearly the largest beneficiary of federal funds for education.

Median household income (cost-adjusted). As shown in figures 33 and 34, while total education revenues across middle income categories do not vary a great deal, a substantial difference is shown between the lowest and highest income categories (\$5,787 versus \$4,690). It is also at the extreme income categories that the local revenue differential becomes quite large, with high income communities outspending their lowest income counterparts by more

than twofold in both actual and adjusted terms. State aid offsets this with a differential in state dollars between the richest and the poorest districts of over 30 percent in adjusted terms (\$1,747 versus \$2,304). Once again, federal dollars are heavily weighted in favor of lower income communities, with federal funding nearly quadrupling between the highest and lowest income categories of districts in adjusted terms (\$113 versus \$446).

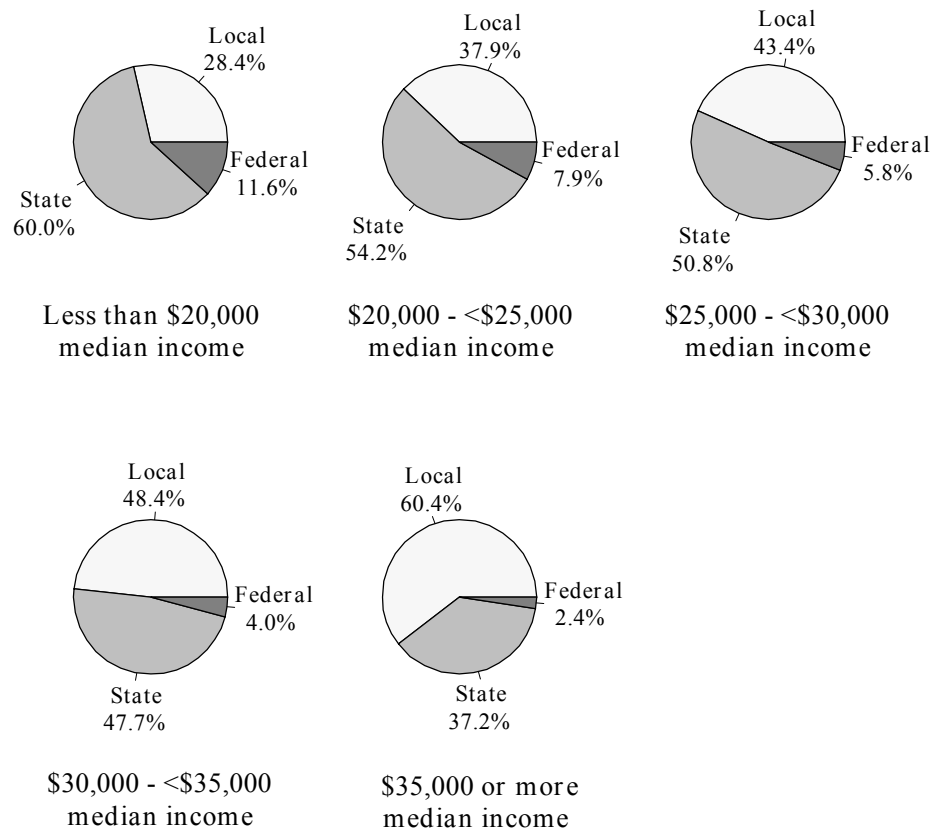
Figure 33.-- Local, state, and federal revenue shares by median household income (cost-adjusted)



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

Median value owner-occupied housing. As shown in figures 35 and 36, relatively little wealth equalization in relation to housing values comes from state aid; in adjusted terms, only

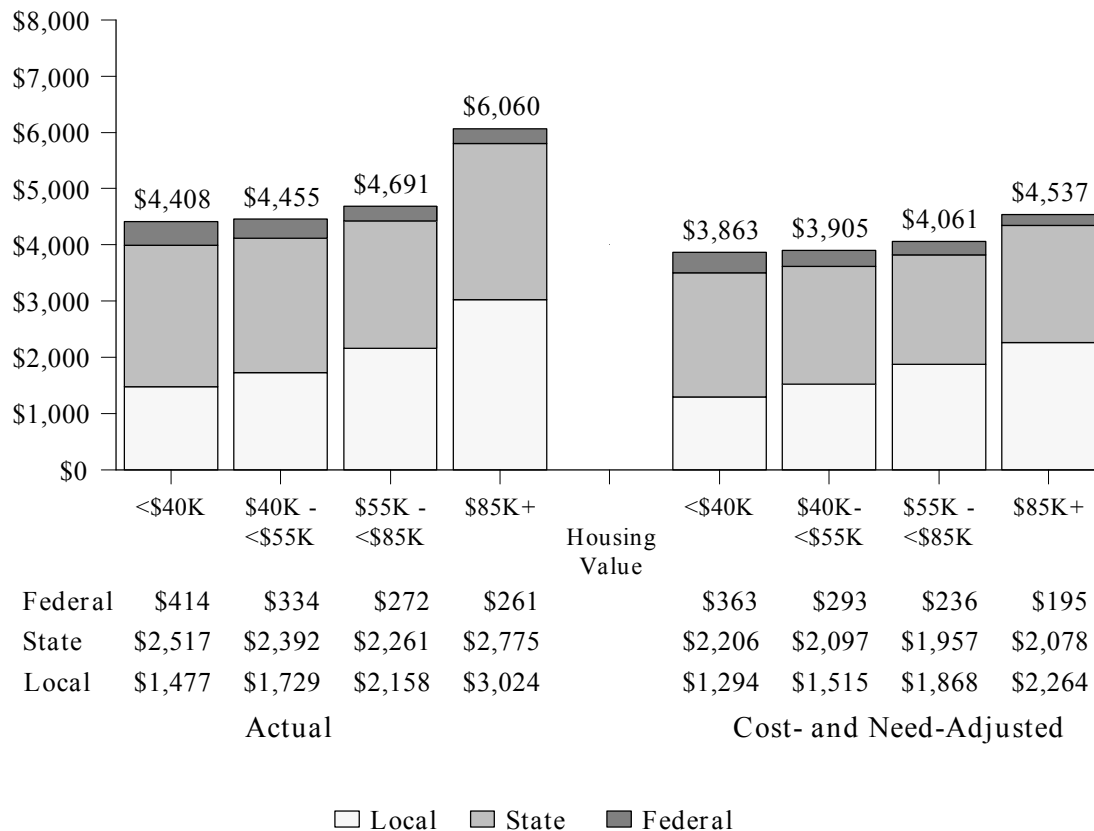
Figure 34.-- Actual local, state, and federal revenue shares by median household income (cost-adjusted)



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

6.2 percent more state dollars go to the lowest wealth districts (\$2,206 versus \$2,078) than to the highest wealth districts. In percentage terms, federal funds show much greater equalizing effects, with federal dollars increasing over 50 percent between the high and low housing value districts.

Figure 35.-- Local, state, and federal revenue shares by median value of owner-occupied housing



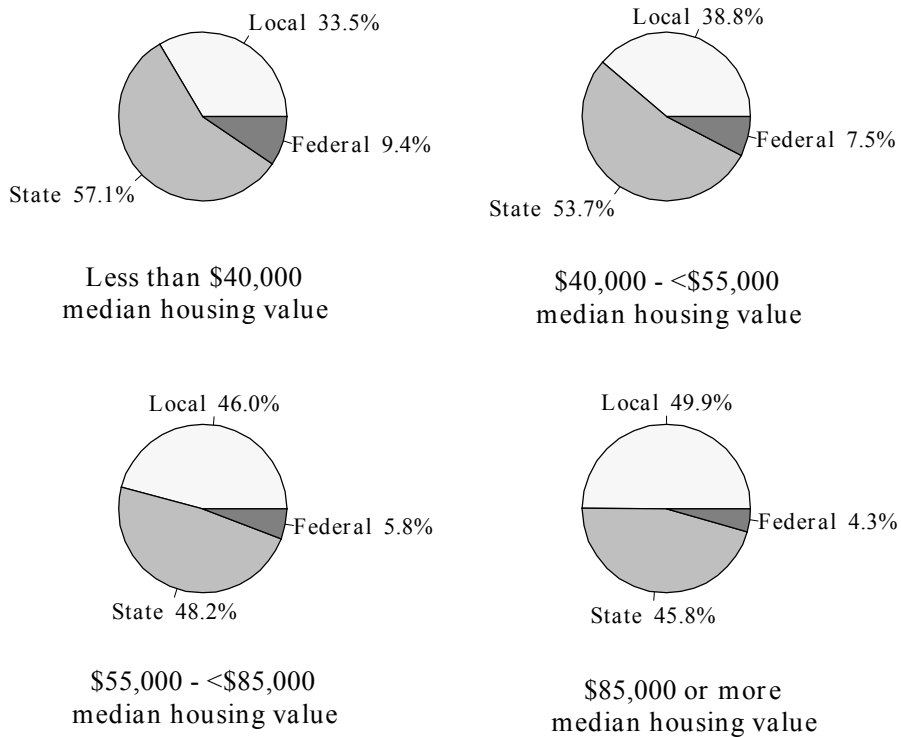
SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

Education attainment of householders. Districts with the lowest average education attainment show the least support from local revenues and the most from state and federal sources in both actual and adjusted terms (figures 37 and 38).

To What Extent Do Education Resource Measures Vary Across the Nation?

Perhaps the primary social commodity guaranteed to the nation's children is their right to a free public education. Because of this, and because of education's strong association with opportunities throughout life, there is a longstanding interest in the fairness with which public

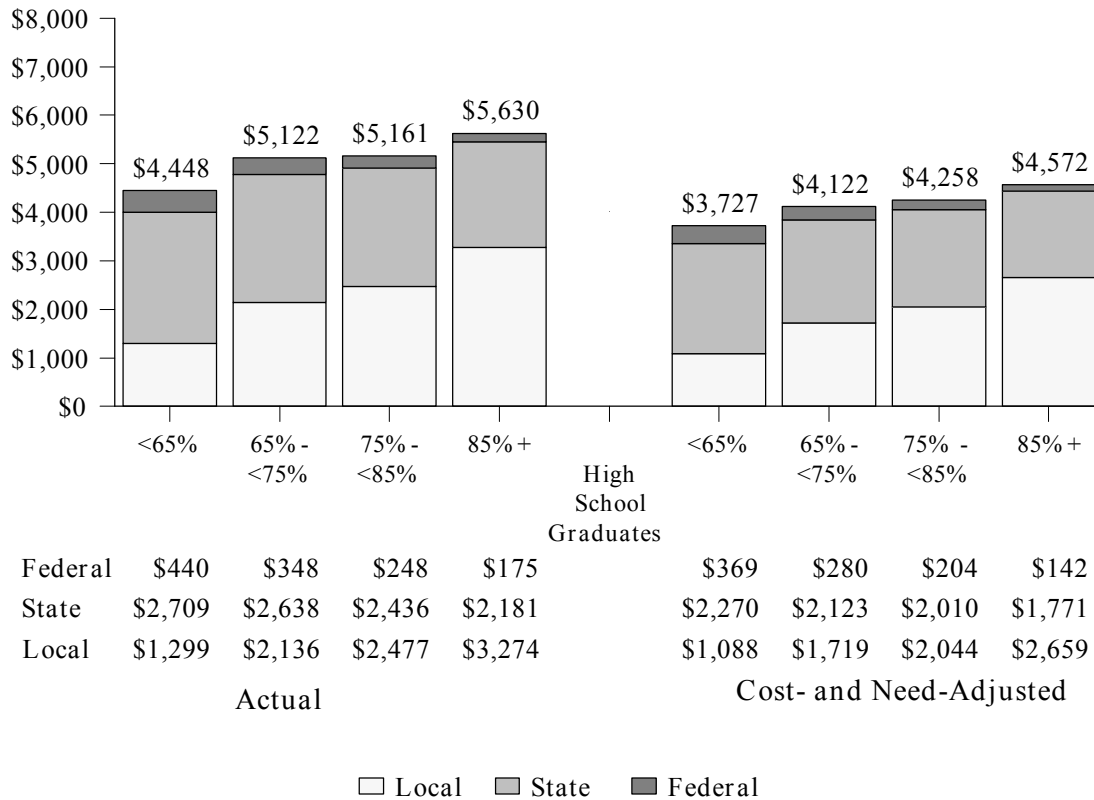
Figure 36.-- Actual local, state, and federal revenue shares by median value owner-occupied housing



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

education resources are allocated. Since the major responsibility for public education lies with the states, this interest has focused primarily on the degree of variation in average expenditures per student both within and across states. States in which the average education expenditure is similar in all districts are considered to have more equitable allocation systems than states with large district-to-district expenditure variations. To what degree is there similarity in education expenditure patterns across the nation?

Figure 37.-- Local, state, and federal revenue shares by education attainment of householders



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-90 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

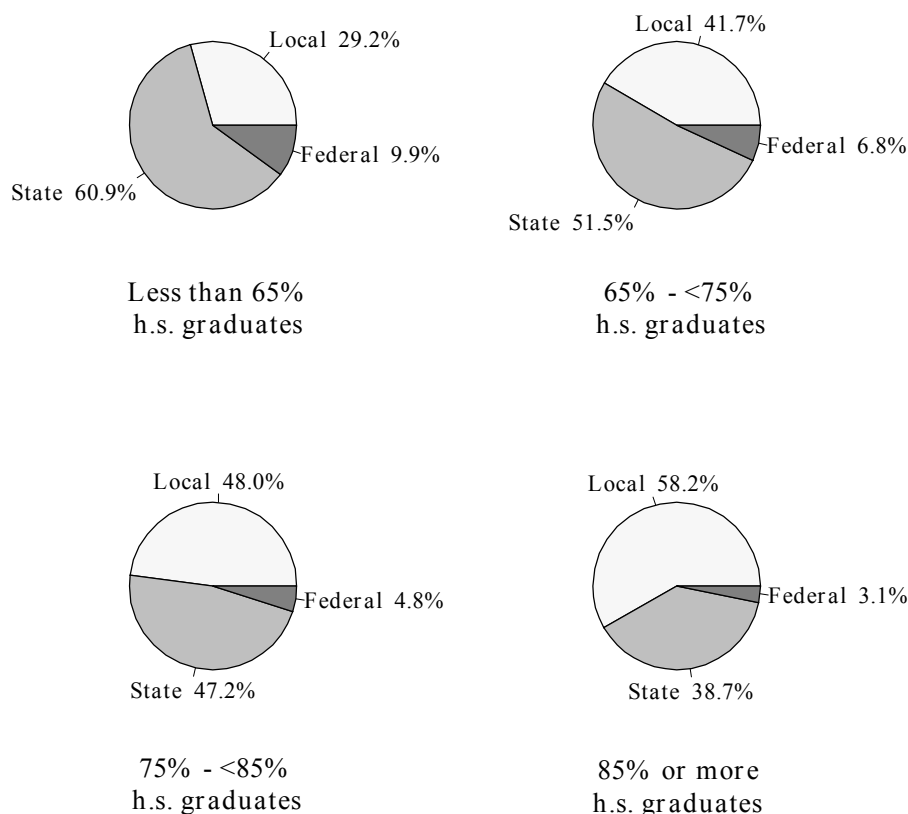
NOTE: All results are weighted by district enrollment.

Summary of findings.

- *Across the nation, the distribution of public education resources is substantially more equalized than wealth as measured in the form of housing values, and somewhat more equalized than variations in household income.*
- *State public education allocation systems are the primary equalizing factors of education resources, with some additional equalization resulting from the various federal funding programs.*

Detailed findings. Broad interest in comparing expenditures has led to questions about how variation in expenditures should be measured. Six alternative measures of dispersion are commonly used in conducting equity analyses (Berne and Stiefel 1984). (See Appendix D for

Figure 38.-- Actual local, state, and federal revenue shares by education attainment of householders



SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1990 Census School District Special Tabulation (summary file set I).
NOTE: All results are weighted by district enrollment.

discussion of these measures and their utility.) For the following discussion, the degree of difference in resources is measured by the federal range ratio and the coefficient of variation. As opposed to the range, the federal range ratio is less influenced by extreme outliers. It indicates how many times greater the resources are at the high end of the distribution than at the low end. In contrast to range measures, the coefficient of variation takes into account all observations. It is a measure of the standard deviation expressed as a percentage of the mean. It is also a measure of dispersion with larger numbers meaning greater dispersion (less equity) and smaller numbers meaning less dispersion (greater equity).

Education equity can be measured in terms of horizontal and vertical equity. Horizontal equity assumes that all students should receive equal resources. Measures of dispersion that employ this principal are found in tables 30 and 31 on the “actual” rows. On the other hand,

under the vertical equity principal (which calls for students with varying levels of identifiable education needs to systematically receive varying levels of education resources), differences in education resources between districts are expected when one district enrolls a larger percentage of special needs students (e.g., special education, LEP, or at-risk) than another. A vertical equity standard reflects the belief that supplemental education resources are necessary to meet the special or additional needs of these students. The vertical equity principal is reflected in the student-need adjustments included in the “cost- and need-adjusted” rows of tables 30 and 31. Overall, these rows show differences in district “buying power” in relation to varying resource costs and student needs as opposed to the actual, or nominal, dollar amounts.

The strong equalizing influence of state revenues is shown by the decline in variation observed when state revenues are added to local revenues (table 30). Although local revenues alone show a coefficient of variation of 69.0, this figure drops to 32.8 when state revenues are added. These measures show that disparities in public school district spending are substantially reduced through the addition of state public education funds. Beyond this, federal revenues continue this equalizing pattern, although not to a great degree (with a coefficient of variation for total revenues of 31.4). These findings hold for the actual (horizontal equity) and the adjusted (vertical equity) rows of table 30.

This finding shows that state resource allocation systems make a substantial contribution to the overall equalization of revenues across districts. The relatively small additional federal contribution to overall equalization is not surprising, as this has never been a specific federal goal. Rather than overall equalization, federal funding programs are intended to support services for specific categorical populations of students.

Table 30.-- Measures of dispersion for actual and adjusted local, local and state, and total revenues

	Federal Range Ratio	Coefficient of Variation
Local Revenues		
Actual	8.0	69.0
Cost- and student-need-adjusted	7.5	64.5
Local and State Revenues		
Actual	1.7	32.8
Cost- and student-need-adjusted	1.3	28.0
Total Revenues		
Actual	1.5	31.4
Cost- and student-need-adjusted	1.2	26.2

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-1990 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Another finding from this study is that less variation is found in student/teacher ratios than in expenditure levels (table 31). This shows that access to classroom teachers is less disparate than indicated by measures of overall education expenditures.

Public education resources are more equally allocated across the country than income or wealth (housing values). However, as highlighted in table 32, total education expenditures are only slightly more equalized than distributions of income. Both of these measures are distributed substantially more evenly than housing values. When variations in student/teacher ratios, rather than total education expenditures, are compared to income and housing values, this core education resource measure is distributed much more evenly than either of these two measures of wealth.

Table 31.-- Measures of dispersion for actual and adjusted total, current operating, and core instructional expenditures, and student/teacher ratios

	Federal Range Ratio	Coefficient of Variation
Total Expenditures		
Actual	1.6	31.6
Cost- and student-need-adjusted	1.3	26.9
Current Operating Expenditures		
Actual	1.5	31.0
Cost- and student-need-adjusted	1.2	25.0
Core Instructional Expenditures		
Actual	1.7	31.5
Cost- and student-need-adjusted	1.2	24.5
Student/Teacher ratios		
Actual	0.9	18.3
Student-need-adjusted	0.9	19.1

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-1990 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Table 32.-- Measures of dispersion for actual and adjusted total expenditures and wealth measures

	Federal Range Ratio	Coefficient of Variation
Total Expenditures		
Actual	1.6	31.6
Cost- and student-need-adjusted	1.3	26.9
Median Household Income (actual)	1.9	34.4
Median Value Owner-Occupied Housing	5.7	69.6

SOURCE: Bureau of the Census, 1990 Census of Governments, Survey of Local Government Finances; U.S. Department of Education, National Center for Education Statistics, 1989-1990 Common Core of Data, 1990 Census School District Special Tabulation (summary file set I).

NOTE: All results are weighted by district enrollment.

Summary of Findings

Four important policy questions that relate to the financing of public education have been addressed in this report. A summary of the findings for each follows.

How do education resource measures, such as total expenditures per student, vary in different types of school districts and communities across the nation? There is a positive relationship between expenditures and wealth whether wealth is measured by the percentage of children in poverty, household income, or housing values. However, this relationship is only consistently observed across all of the categories of housing values. For the other two wealth variables, higher expenditures are only found for the highest income and the lowest poverty districts. The general inverse relationship between expenditures and wealth is offset by findings relating to other socioeconomic variables relating to equity. For example, no clear expenditure differentials are found for limited English proficient and at-risk students, and a positive relationship is found between expenditures and the percentage of minority students. It is also important to note that expenditure differentials are only shown for districts enrolling the lowest percentages of students in poverty (less than 5 percent), and that these districts only serve about 11 percent of all public school children. Expenditures are relatively equal across other poverty categories within districts.

How do school districts serving different types of students and communities allocate resources across the categories of instruction, administration, and capital outlay? Capital outlay is the area of expenditure found to be the most sensitive to variations in total district spending. Districts with less to spend tend to focus on direct instruction and administration at the expense of capital expenditures. Districts serving relatively high percentages of students in poverty, who are minority, or with limited English proficiency allocate greater percentages of their funds for core instructional purposes than do districts serving lower percentages of these same groups of students. By region, districts in the northeastern section of the country spend more than the other three regions (the Midwest, the South, and the West), and districts in the West spend appreciably less. For example, in the area of administration and support, districts in the Northeast outspend the West by 65 percent.

How do local, state, and federal revenues vary for school districts serving different types of students and communities? The amount of local support for public education rises with the wealth and socioeconomic condition of the community. State funding sources exhibit a strong equalizing effect on the overall distribution of revenues across districts. Although state and federal allocations are larger in districts with large numbers of special, compensatory, and limited English proficient students, based on the student-need adjustments used in this study, these supplemental funds may be insufficient to offset the costs of the additional programs required to offset the additional needs of these students.

To what extent do education resource measures vary across the nation? The distribution of public education resources is substantially more equal than overall measures of wealth in the form of housing values, and somewhat less varied than wealth in terms of household income. This equalization comes primarily through the influence of state allocation systems with some additional equalization resulting from the various federal funding programs.

In conclusion, the data compiled for this report have provided a first opportunity to examine critical relationships in education fiscal policy, such as real levels of education resources and student poverty across the school districts of the nation. Based on this information, what can be said about public school district spending in America?

Students in public schools across the nation do not always receive comparable quantities of education resources, and in some cases districts enrolling students with the lowest relative levels of special needs appear to receive the most in the way of education resources (i.e., students in districts with the lowest percentages of students in poverty or in special education programs.) Furthermore, this relationship between expenditures and wealth holds whether wealth is measured in terms of children in poverty, household income, or housing values. On the other hand, only the students in the lowest poverty schools receive substantially more education resources, and independent of other district and community variations, a positive relationship is shown between the percentage of minority students and education expenditures.

State funding systems provide by far the greatest equalizing influence in education expenditures across America, with federal funding also contributing somewhat to equalization. Overall, education expenditures appear to have an equalizing influence across the nation, varying substantially less than housing values and somewhat less than average income.

Core instructional expenditures are least affected by expenditure differentials across districts. Rather, there appears to be a pronounced trend for districts with less to spend to cut back on capital expenditures. Districts in the Northeast spend appreciably more than other regions of the country, and districts in the West spend the least.

Implications for Further Research

In addition to equity issues, the findings discussed in this report also pertain to concerns about the overall adequacy, or sufficiency, of public education resources throughout the nation. Because no absolute standards of educational adequacy have been developed, this concept can only be assessed in comparative terms. The results obtained through multiple regression demonstrate that school district spending substantially varies by geographic region, as does student/teacher ratio. This substantial difference in education funding by region may be a matter of concern. One of the many factors that may be driving this differential between the relatively high spending states of the Northeast and Midwest, as compared to those of the West and South, is the relative reliance on local funding sources. In an effort to obtain funding systems that are more equalized intrastate, some states have elected to emphasize state, rather than local, funding sources. These systems tend to be more equalizing because they rely less on the ability to raise local funds. Local revenues for public education in the western states are substantially lower than those raised in the Northeast, and are accompanied by a \$1,661 per student total expenditure difference between these two regions. The 17.7 student/teacher ratio in the Northeast is also substantially lower than the 25.1 ratio in the West. Whatever the cause, the implications of the differences in school district spending between geographic regions need to be thoroughly explored by the school finance research community.

Two findings of this study run somewhat counter to initial expectations. First, spending by school district size is higher only for those school districts with under 1,000 enrollment, other factors being equal. This seems to suggest that the expected diseconomies of small scale only hold for the nation's smallest school districts, a finding that may elicit further study. The fact that this variation is more pronounced in the multivariate analysis suggests that differences in district size may underlie other observed relationships, such as that between metropolitan status and expenditures. Although about one-half (52.2 percent) of the school districts in the country fit into the classification of school districts with under 1,000 enrollment, they serve only 7.1 percent of the nation's public school children.

A second, somewhat surprising, finding is that more money is spent in districts with the highest percentages of minority students compared to districts with the lowest percentages of minority students (\$4,514 versus \$3,920), holding other school district characteristics constant. This suggests that other influential school district characteristics, such as low property wealth, are associated with lower school district spending, which is sometimes thought to be a by-product of racial composition. The multivariate analysis shows that among school districts with the same geographic location, size, wealth, and student need characteristics, spending is actually higher in districts with high percentages of minority students. This is a somewhat unexpected and encouraging finding, and should be further explored in future studies by school finance researchers.

A less surprising finding is that greater total expenditures per student are associated with higher community socioeconomic status, measured by the value of owner-occupied housing (per student expenditures of \$4,401 versus \$3,992, other factors held constant), or by education attainment (\$4,515 versus \$3,953). Unlike the findings for school district size, these results suggest a linear relationship; that is, each increment in socioeconomic status results in higher expenditures. Differences in student/teacher ratios also appear but are less than 1.5 students per teacher. Of interest are the relatively modest dollar differences that occur between socioeconomic groups, compared to the large differences caused by geographic region.

When socioeconomic status is measured by cost-adjusted median household income, however, and all other factors are held constant, the expenditures per student between the highest and lowest income groups differ by only \$186 (\$4,382 versus \$4,196). These findings relating alternative measures of socioeconomic status to education spending provide a fertile field for further research.

Public education total expenditures per student are highest in low poverty districts, but unlike socioeconomic status, the relationship is not linear. Controlling for other factors, the differential between the highest and lowest poverty districts is \$309 per student (\$4,219 versus \$4,528). However, while school districts with 5 to 15 percent school-age children in poverty spend \$4,227, those with 25 percent or more in poverty spend \$4,219, a difference of only \$8.

For most school districts, those with more than 5 percent of school-age children in poverty, per student spending is comparable. Controlling for other school district characteristics, only school districts in the category with the fewest children in poverty spend substantially more per student. Unlike previous studies, we do not find that spending rises with higher percentages of school-age children in poverty.⁸

It is also worthy of note that smaller dollar differences in per student expenditures are observed when core instructional, as opposed to total, expenditures are examined by socioeconomic status (see table A11 in Appendix A). Whether socioeconomic status is measured by the value of owner-occupied housing (\$2,669 versus \$2,518), by education attainment (\$2,700 versus \$2,470), or by median household income (\$2,701 versus \$2,513), other factors held constant, the observed differences in expenditure decrease to \$151, \$230, and \$188, respectively. Core instructional expenditures is a term designed to reflect the central purpose of the local education agency, which is to educate children. Similarly, controlling for other school district characteristics, core expenditures per student for school districts with high and low concentrations of school-age children in poverty differ by only \$113 (\$2,592 versus \$2,705).

These findings suggest that lower wealth districts appear to be investing a larger percentage of their spending on core instructional expenditures, rather than on other areas of their budgets. Although such findings mitigate total expenditure per student spending differences found by socioeconomic status, these findings may also indicate that poor school

⁸ *These findings differ from earlier analyses of the relationship between education expenditures and poverty conducted by Schwartz and Moskowitz (1988). Their state-by-state analyses reported 3 states with negative correlations, 14 states near zero, and 33 states with a positive relationship between these two variables. To further test our findings, which are based on more current data and evaluate this relationship on a national basis, we ran analyses dividing the districts into exact poverty quartiles. We also ran a straight correlation between the various measures of education spending used in this report and the percentage of school-age children in poverty. In each case we found a negative relationship between spending and poverty. Further analyses would be required to determine whether these contradictory findings represent a change over time (the Schwartz and Moskowitz poverty data are from 1979, while the data used in this report are from the 1990 census) or represent differences in the unit of analysis or in the methodological approach.*

districts are deferring needed school construction and renovation and the purchase of instructional equipment. Other evidence exists to suggest that this is precisely what is occurring. For example, a survey conducted by the American Association of School Administrators in 1991 found 12 percent of the buildings in the country to be inadequate and estimates costs of \$100 billion to remedy these deferred maintenance needs. The current study was not able to completely explore the differences in spending for capital outlay, which includes both school construction and the purchase of instructional and other equipment. This also provides an opportunity for further research.

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